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ABSTRACT

A project was undertaken at Central Piedmont Community College (CPCC), in Charlotte, North Carolina, to develop, field test, and validate reading courseware for adults that takes into account individual learning styles. Two literacy products were developed and evaluated. The first, the Learning Style Survey (LSS), is an interactive videodisc developed to assess the preferred learning styles of low-literate adults. The LSS was validated through field tests involving more than 1,000 adult students nationwide, which revealed that over 60% of the participants reading below a 9th grade level had a strong preference for auditory materials, while 60% of those reading at a high school level preferred visual materials. The second product, the Reading to Educate and Develop Yourself (READY) videodisc, provides a series of nine microcomputer-based reading comprehension modules which include considerable auditory materials. The modules cover: (1) an introduction to the system; (2) locating important parts of the text; (3) vocabulary improvement; (4) locating key words in a sentence; (5) comprehension through the use of synonyms; (6) identifying the topic of a passage; (7) identifying a sentence that summarizes the main topic; (8) tests of student comprehension; and (9) a review of vocabulary. Validation of the READY course, involving a comparison of students in READY courses with students in traditional courses at two community colleges, showed generally positive results. Appendixes include a 111-page report on the validation of the LSS, an LSS brochure and other information on using videodiscs to assess preferred learning styles, the READY course manual, a report of instructor comments on the READY course and preliminary results of a validation study, and lists of colleges using the components. (MAB)

ED358876

Final Report

Central Piedmont Community College
Charlotte, North Carolina

FIPSE - Adult Literacy Courseware Development
September 1, 1985 - December 30, 1988

Grant # G008541045

JC 930 291

Dr. Tom Griffin, Project Director
Tim Songer, Project Coordinator
Central Piedmont Community College
Charlotte, North Carolina

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CENTRAL PIEDMONT
COMMUNITY COLLEGE

April 24, 1989

Ms. Sandra Newkirk
Fund for the Improvement of
Postsecondary Education
7th and D Streets, S.W. Room 3100
Washington, DC 20202-3331

Dear Sandra:

Attached you will find our final report for FIPSE grant # G008541045. This project developed, field tested, and validated reading courseware for adults which factors in individual learning styles. In the report are listed the titles of four modules that were developed during this project. These modules represent approximately twenty hours of instruction specifically related to adult needs and interests. As we were engaged in this project technology continued to develop, expanding our capabilities. As a result, we added digitized audio to these modules of instruction, greatly enhancing compatibility with the preferred learning style of many adults.

This enhancement was the result of information obtained from the field test of a second product of this grant, the Learning Style Survey. The Learning Style Survey is a videodisc that measures the individual's preference for audio or visual presentation of instruction material. We discovered in a national field test of this videodisc that adults with low reading ability had a strong preference for audio input. Realizing that computer based instruction is visual, we added digitized audio to our modules. By including topics of interest to adults, using state of the art programming tools, including audio and incorporating elements of individual learning style, we feel that we were able to accomplish the objectives of our proposal with added value.

Tim Songer did an outstanding job as project coordinator. Largely through his leadership and creativity were we able to obtain the results that we did. Attached documentation will support very successful results. Also, the appendix will document the various phases of the project, its evaluation, and its completion and dissemination. In the course of this grant period, we generated enough interest in our project so continued development of adult

literacy software is possible through other funding sources - an important measure of success for a FIPSE project.

We believe we have accomplished the objectives of the project with high standards. It has certainly been worthwhile for Central Piedmont Community College to have been involved in this kind of development. We wish to thank you especially for your time and the support you have given to this project. We also wish to thank the entire FIPSE staff for all the work that went into planning the project directors' meetings. This annual event was extremely helpful and provided an excellent forum for us to share our ideas with you and our colleagues from across the country.

We look forward to the opportunity to work with you and with the FIPSE organization again in the near future. If there is any additional information that you desire about this project, please do not hesitate to call.

Sincerely,

Thomas E. Griffin
FIPSE Project Director
Dean, Basic Studies

cc: Ruth Shaw
Tim Songer
Bette Holley

FIPSE - Adult Literacy Courseware Development Project
Central Piedmont Community College

EXECUTIVE SUMMARY

Central Piedmont Community College (CPCC) with funding from the Fund for Improvement of Postsecondary Education and the State of North Carolina has completed work on a grant designed to develop programs using new instructional technology to improve the reading skills of low-literate adults. Dr. Tom Griffin was the Project Director and Tim Songer served as Project Coordinator. Several important questions in the area of improving the quality and effectiveness of reading courseware for adults were addressed and two literacy products were developed and evaluated. The Learning Style Survey is an interactive videodisc designed to assess the preferred learning styles of low-literate adults. The READY Course is a micro-computer based reading comprehension curriculum for adults functioning between the fourth and eighth grade level.

One of the first questions faced by the project team was how to best understand the differences between adults functioning at a fourth grade reading level and adults at a high school level and above. For twelve years prior to the beginning of this project, CPCC had been using a learning style assessment instrument to help new students, particularly those who were least prepared for college courses, better understand their own learning style preferences and strengths. The project team knew this type of information could be extremely valuable to low-literate adults and their instructors, but since the instrument was paper-and-pencil based, the items were too difficult for our students to read and comprehend. The Learning Style Survey was developed in order to discover the learning style preferences of this population. The Learning Style Survey uses the video and audio capabilities of interactive videodisc technology to present the thirty-two questions that make up the assessment instrument. Students typically complete the program in less than thirty minutes and receive feedback appropriate to their preferred learning style. This information describes important ways the user can apply individual learning style techniques in order to learn more efficiently.

The Learning Style Survey was validated in a field test spanning twelve months and involving more than one thousand adult literacy students from across the country. This study showed the validity and reliability of this instrument with adults functioning at or above a fourth grade reading level. One of the most interesting results of this research was that over 60% of all adults reading below the ninth grade level indicated a strong auditory learning style preference. That is, this group prefers to learn using auditory materials. This finding is significant in terms of the second development stage of this project because it told the project team that the READY Course would be much more effective if there was an auditory component designed into it.

The READY Course is a series of micro-computer based reading comprehension modules for adults functioning between the fourth and eighth grade level. Because of the importance of audio to this group, digitized audio is a major part of the course. The READY Course was originally designed by the project's literacy consultant, Dr. Tom Duffy of Indiana University. The project team at CPCC took Dr. Duffy's design and using the TenCore authoring language, created a courseware format using four paragraphs of text that provide the content for eight reading comprehension exercises. Each module of the READY Course contains an average of five hours of instruction and is built on this format with paragraphs written on topics of interest to adults. During the project period, four modules were completed and six additional modules have been developed with funds from the N.C. Department of Community Colleges. A Dissemination Grant from FIPSE was used to evaluate the courseware as compared to traditional classroom instruction and other reading courseware. The results were very positive and are currently being replicated on a larger scale with literacy students in North Carolina.

BACKGROUND

Definitions of literacy abound, as do estimates of its frequency in the population of the Nation. In 1983, a release distributed by the White House stated that "26 million Americans are functionally illiterate...". A report for the Sunbelt Institute released in 1988 states that over 37 million adults in the U.S have less than an eleventh grade education and "...the median job created in the U.S. economy between 1984 and 2000 will require 13.5 years of education". The cost of illiteracy is staggering. Estimates vary, but it is not uncommon to find estimates as high as $20 billion annually in industrial and tax expenditures connected directly to illiteracy. The cost to the psyche of someone who cannot read cannot be measured.

In 1983, CPCC obtained private and county funding to address this issue on a local level through the establishment of Project ABLE (Adult Basic Literacy Education), an educational delivery system that combines the use of the micro-computer along with other technologies used by paid instructors and volunteer tutors with low-literate adults. Project ABLE's success in teaching adults how to read is shown by the fact that the nine courses which make up the Basic Skills Reading Series courseware used in Project ABLE require an average of 225 hours of student time for successful completion, or about 37 hours of instruction per grade level. The Charlotte-Mecklenburg School System estimates that it takes about 150 hours of classroom instruction to progress just one grade level in reading.

While it was clear that the approach taken by Project ABLE was effective, it was equally clear that the program was not working as well as it should in the areas of student progress and retention. The major reason was attributed to the lack of adult oriented materials for use in the program. All systemized courseware available in 1983 had been written for and field tested on children. In 1985, CPCC requested assistance from FIPSE to develop materials that would meet the special requirements of adult learning; in particular, materials to be developed were to be relevant to adult life, immediately applicable, and intellectually stimulating. FIPSE awarded a three year grant to develop adult oriented courseware for students functioning between the fourth and eighth grade levels, and to field test it nationally. This research and development grant is called Project READY (Reading to Educate and Develop Yourself).

Dr. Tom Griffin, Dean of Basic Studies at CPCC was named Project Director, and Tim Songer was hired as Project READY Coordinator. Cindy Johnston, Director of CPCC's ABLE and ABE programs, and her staff of instructors completed the project team. The initial questions addressed by the project dealt with the differences between adult students functioning below a ninth grade reading level and children functioning at the same level. Since a major goal was to improve learning effectiveness by developing courseware designed specifically for adults, one of the first steps was to look at the courseware being used at the ABLE Centers (courseware designed for use by children) and try to understand what components of these programs were inappropriate for adults. Adult learning theory provides much information about the importance of recognizing the great number of experiences adults bring into the learning situation, so the materials needed to contain content relevant to adults. The ABLE Program instructors also knew that the adults who entered the program needed to see progress very quickly in order to be convinced that reading instruction was worth their time and effort. One very important trend among ABLE students was that over 80% of those who attended six sessions at the Center stayed until they completed the goal they had set for themselves when they first enrolled. Student progress and its effect on retention became the first research question addressed by the project.

Since the early 70's CPCC had been evaluating the use of various assessment instruments. One innovative approach to understanding how underprepared students could better succeed was a learning style assessment called the Cognitive Style Interest Inventory. This instrument was designed by Dr. Joseph Hill, President of Oakland Community College in Bloomfield Hills, Michigan and field tested at CPCC and other colleges around the country. The goal of this assessment was to help students understand their own style and help instructors armed with knowledge of individual preferences be better prepared to meet their students' needs. The Developmental Studies Group at CPCC had successfully implemented use of this instrument after satisfactory field testing was completed and still use it today. The Project READY staff knew that learning style information might be extremely valuable to literacy students because this group had a

track record of very poor educational experiences and needed help understanding how to learn. Unfortunately, Hill's instrument could not be used by a low-literate population because of the high reading level required to comprehend this extensive paper-and-pencil instrument. A combination of events then lead to the development during year 1 of the FIPSE grant of the Learning Style Survey interactive videodisc.

CPCC and nine other member colleges of the League for Innovation in Community Colleges each received a grant from Sony Corporation for use of its interactive videodisc hardware called the VIEW System in 1986. This hardware grant combined with the FIPSE funding created a good opportunity to develop a unique assessment instrument specifically for low-literate adults. The project team knew their students could answer assessment questions drawing on their own experiences if those questions were somehow visualized for them rather than written down. The Learning Style Survey is modeled on the items in Hill's instruments pertaining to visual or auditory learning style preferences, and provides the user with a "visual question" that is easy for low-level readers to understand and respond to. This type of interactive videodisc assessment had never been developed before, so the project team chose to look at only two of the twenty eight learning style areas covered in Hill's instrument. Visual and auditory preferences were assessed in the Learning Style Survey because literacy instructors felt this type of information would be most immediately useful to their students and themselves. Results of the validation of this instrument provided the project team with valuable information necessary to create effective reading courseware: more than 60% of adults functioning below the ninth grade in reading skills showed a strong preference for auditory materials. This information was not available before the Learning Style Survey was developed and tested, and it pointed to one major problem with 98% of the reading courseware being used with adults, almost all courseware was completely silent.

Development of the READY Course began in the early weeks of year 2 of the grant. Dr. Tom Duffy, the project's literacy consultant agreed to use his many years of experience in developing reading courseware for the military and the State of Pennsylvania to provide the project with a format for teaching the most important reading comprehension skills to adults functioning between the fourth and eighth grade. This extensive "paper format" was received in December, 1986 and review by the project staff began in January. Once the team was satisfied that the format met the objectives described in the original grant proposal, planning for development began. The additional requirement that an audio component be included in the design was noted by the project team when field test results compiled in 1987.

DEVELOPMENT AND EVALUATION -- The Learning Style Survey

Development of the Learning Style Survey began in June, 1986 with a meeting of the project team. A videodisc consultant, Steve Floyd, President of Floyd Consulting and Design, was brought on board to assist with the planning, production and post-production. An instructional design group, Handshaw and Associates, was hired to develop an audience analysis document (p. 66, Appendix A - Instrument Validation Report) and assist in scripting and screen design. Sue Ferguson served as art director, helping make script decisions and designing all graphic screens and video screen formats. Karen Mosteller was the video director and managed a staff of 15 freelance actors and crew members. Dr. John Gretes, Associate Professor of Education at the University of North Carolina at Charlotte, served as the evaluator. Tim Songer was the videodisc producer.

Shooting began late in August and continued through mid-September with a total of six shooting days. Early in the script development process, the team agreed that a recognized spokesperson that members of the target audience could relate to would be a big boost to the effectiveness of the final product. Wally Amos had been on CPCC's campus earlier in 1986 speaking to literacy volunteers, so he was contacted and agreed to be the on-camera spokesperson at no charge to the project. His role in the program is described in Appendix B - The Learning Style Survey Brochure. Mr. Amos' presence in the program and his support of the project has been invaluable to its success.

Post-production took place at Crawford Production Services in Atlanta. The project team had agreed to shoot for the highest level of production, editing, and graphics capability affordable.

The audience this program is designed for are very sophisticated in terms of recognizing professional video production quality so a good design could be compromised by poor lighting, acting, editing, or lack of modern special effects. All the computer graphics and digital video effects were careful designed and tested with small groups of literacy students before final editing. The value of this process is described in Appendix C - Using Videodisc to Assess Learning Styles. After final editing, a one inch master videotape was produced and from that tape the videodisc master was stamped by 3M Corporation. The master is still in storage at 3M.

The final development stage was programming so the videodisc would operate as a level three program rather than a linear video. In order to save time and avoid costs associated with purchasing an authoring language for the Sony VIEW System, Technical Industries of Georgia was hired to complete the authoring. Using the CDS Genesis authoring package, and following the flowchart developed by the project staff, authoring was completed in two months and finalized for testing to begin in March 1987.

Because of the experimental nature of this assessment instrument, a three phase evaluation plan was developed by Dr. John Gretes, and implemented by the project staff. The basic approach was to prove that the Learning Style Survey is as valid and reliable as the Cognitive Style Interest Inventory for our audience, and to show it was much more acceptable and useful for this group. A summary of the evaluation follows. For a full description of the evaluation procedures and results, see Appendix A - Instrument Validation Report and Appendix D - Validation of the Learning Style Survey: An Interactive Videodisc Instrument.

The first phase of testing took place at CPCC using a storyboard consisting of nearly 100 black and white photographs. The storyboard and script were developed to represent the short video sequences that precede each question in the assessment. Twenty-two students were asked to respond to the questions represented by the storyboard and later to respond to an oral presentation of the Cognitive Style Interest Inventory. The storyboard was revised five times and revisions were completed when the students' responses to the two separate sets of questions correlated at a .84 level (Pearson Product Moment Correlation Co-efficient).

The second phase of testing also took place at CPCC, this time using the completed interactive videodisc. Over one hundred students participated in this evaluation. Again the students viewed the Learning style Survey and completed the Cognitive Style Interest Inventory. Two groups were created randomly with one group completing the videodisc first and the other completing the paper-and-pencil test first. A minimum of five days passed between test administrations. This phase of the evaluation also showed a strong correlation (.74) between the two instruments. In addition, testing at this phase resulted in refining the computer program that operated the videodisc to eliminate minor problems and streamline the presentation.

The third and final phase of the Learning Style Survey validation study took place in community colleges across the country. Over five hundred students participated in nine cities (Charlotte, Cleveland, Chicago, Miami, Newark, Phoenix, Oakland, St. Louis, and Eugene, Oregon). Students were randomly assigned to four groups. Two groups completed both the Learning Style Survey and the Cognitive Style Interest Inventory with the only difference being which instrument was presented first. A third group took the Cognitive Style Interest Inventory twice. The final group took the Learning Style Survey twice. A minimum of five days separated the testing. The results again shows the strong validity and reliability of the Learning Style Survey.

For a self-report type of instrument, any correlation above .60 suggests strong validity. For the national field test, the Pearson Product Moment Correlation Co-efficient of Stability and Equivalence was .68 (Groups 1 & 2, n=195). The Test-Retest Reliability Correlation was .75 for the Cognitive Style Interest Inventory (Group 3, n=76) and .78 for the Learning Style Survey (Group 4, n=45). Cronback's ALPHA Test for Internal Consistency resulted in scores of .85 for Group 3 and .87 for Group 4. Both reliability and consistency scores were very strong and suggest that the Learning Style Survey is slightly more reliable over time and internally consistent for this audience than the Cognitive Style Interest Inventory.

Two final statistical tests (Factor Analysis and Multitrait/Multimethod Matrix) show evidence of the construct validity of the Learning Style Survey. These tests suggest the presence of two factors, which are shown to be matched to preferences for visual and auditory learning materials. A questionnaire distributed to the field test participants showed that 80% of the respondents found the Learning Style Survey to be easier to complete than the Cognitive Style Interest Inventory, 100% found it to be more interesting, and 85% said they would recommend it to a friend. The most interesting data that resulted from the national field test showed that over 60% of the participants who read below a ninth grade level have a strong preference for auditory materials. By contrast, 60% of the participants reading at a high school level preferred visual materials.

DEVELOPMENT AND EVALUATION -- The READY Course

The development of the READY Course began early in the second year of the project. During Year 1, several attempts were made to develop a reading course format that would contain content relevant to adults, be instructionally sound, and be easily replicated. This early phase of development resulted in several hours of reading courseware production. However, pilot tests with students from the literacy centers at CPCC were not very positive in terms of student interest in the format and instructional effectiveness. Review of these materials by three courseware designers in different parts of the country were uniformly discouraging. This initial course of development was abandoned as work on the videodisc began, but several important lessons were learned that lead to the ultimate success of the READY Course.

One of the biggest problems with the initial courseware development was reliance on a programmer (at the time a full-time employee of the project), using a programming language to convert the scripts developed by reading instructors into workable computer courseware. Because of the sophistication of the types of exercises needed to teach reading comprehension skills, using a programming language would require a great deal of time and effort and a level of programming expertise beyond the budget of Project READY. Another problem was agreeing on the most important reading comprehension skills needed by adults functioning below the ninth grade level. There is reams of research available on reading skill development in children, and a significant though much smaller amount written on reading development in adults. The project staff reviewed much of the literature searching for a list of the most important skills adults need to have. Unfortunately, the results of this review were succinctly described by one of the instructors when she said,"We can summarize all the areas where the reading experts agree on a blank piece of paper."

As the project entered its second year, both of the dilemmas described above needed to be addressed quickly so the work of courseware development could begin. With the assistance of Handshaw and Associates, a courseware design and development firm, the project staff evaluated ten authoring languages and purchased TenCORE, a powerful tool for creating courseware without using a programming language or computer programmers. An instructional designer, Chuck Barger was hired to develop the courseware using the TenCORE authoring language. Dr. Tom Duffy was retained to design the instructional format that became the READY Course. Since the experts in reading could not agree on the most valid approach, the next best thing was to choose an expert who had a proven record in developing effective reading instruction including computer courseware. Dr. Duffy's work was delivered to the project as a paper format. The TenCORE authoring language was chosen to convert this format to computer because of the unique features it offered including use of a mouse as the student input device. Dr. Duffy's format required the mouse for student input so students could manipulate text on the screen without typing. The mouse also allowed the development of very sophisticated exercises that were not possible using the keyboard alone.

The READY Course development was completed during the third year of the project and digitized audio was added during the last six months of the final year. Following is a list of the objectives and lessons included in the courseware format. For a more complete description of this program see Appendix E - The READY Course -- A Reading Comprehension Program with Digitized Audio.

Lesson 1 -- Ready, Set, Go

Objective

This is an introductory lesson designed to build the student's skill with the mouse before beginning the reading exercises.

Lesson 2 -- Setting Reading Goals

Objective

The student will be able to identify methods for locating the most important information given a specific passage of text.

Lesson 3 -- Vocabulary

Objectives

- The student will be able to read a passage and pronounce selected words
- The student will be able to recognize correct usage of selected vocabulary words

Lesson 4 -- Quick Scan for Information

Objectives

- The student will be able to locate a given word in a passage of text by quickly scanning the passage.
- The student will be able to identify the key word or words in a sentence.

Lesson 5 -- More Quick Scan (First Level Inference)

Objective

The student will demonstrate comprehension of a passage by answering questions using synonyms for key words in the passage.

Lesson 6 -- Organization

Objective

The student will be able to identify the topic in a passage of text and match ideas to the topic to form an overall organization of the passage.

Lesson 7 -- Summarizing

Objective

The student will be able to identify a sentence that summarizes the main idea of a passage.

Lesson 8 -- Answering the Important Questions

Objective

The student will be able to demonstrate comprehension of a passage by answering the goal setting questions from Lesson 2.

Lesson 9 -- Hard Word Review

Objective

This lesson gives the student an opportunity to review the vocabulary words introduced in Lesson 3.

The READY Course format uses the same four paragraphs of text for each of the lessons within a module. Ten modules have been completed to date using content of interest to adults. From the following list of topics, the first four were developed during the FIPSE grant and the

remaining six were developed with funding from the North Carolina Department of Community Colleges.

The READY Course Titles

Health Issues: Tetanus
Health Issues: Heart Attacks
Consumer Issues: Saving Money with Generic Drugs
What Should You Do If You Are In A Car Accident
Health Issues: Eating Right to Avoid Health Problems
Consumer Issues: Buying a Used Car
Consumer Issues: Buying Good Nutrition for Fewer Dollars
Consumer Issues: Buy Now Pay Later
Rights and Responsibilities of Renters
Say What You Think By Voting

Evaluation of the READY Course began during development when members of the project staff presented individual lessons as they were being developed to students at the ABLE Centers. Several ABLE instructors also participated in this informal evaluation process. A wealth of information was obtained during this process in terms of logistics, instructional approach, and wording of the directions to individual lessons. Both the students and instructors were able to point out areas where simple improvements could be made that greatly increased the effectiveness of the final product. The second phase of evaluation (Appendix F -- The READY Course Instructors' Comment Report) took the form of a written survey completed by literacy instructors who use the courseware with their students. Their comments were extremely positive in most areas and provided the project team with useful suggestions where improvements were needed. Most of the changes suggested have already been implemented.

Formal evaluation began in September, 1988 with assistance from a FIPSE Dissemination Grant. The initial evaluation design included six community colleges from across the country. Due to a variety of logistical problems, useful results were obtained from only two colleges, CPCC and Lane Community College. The research was a comparison of the READY Course to traditional classroom instruction and to other reading courseware. Students participating in the study were given a standardized reading test (the ABLE Screening Battery) before instruction began and at the end of the test period. A comparison of gains in terms of the test raw score between the experimental group (the READY Course) and the control group (classroom instruction and/or other courseware) suggests that the READY Course is almost four times as effective as other forms of reading instruction (see Appendix G - The READY Course Evaluation: Preliminary Results). Results from other colleges who were part of the original design are still being compiled, but these preliminary results are very positive. This study is being replicated during the spring term at ten North Carolina Community Colleges using fifty hours of READY Course modules and a much larger number of participants.

DISSEMINATION

Information about the READY Project has reached thousands of educators across the U.S., Canada, and Europe. The Project Coordinator answers several calls per week about the project from interested instructors, administrators and software developers. Word about the project's success has been disseminated by word of mouth from the U.S. Department of Education, through numerous articles written by the project staff, through mailings from CPCC, and via presentations made at national, regional, and state conferences. Following is a list of the major presentations made by the Project Coordinator over the last two years of the project:

13th Annual Conference of the League for Innovation in the Community College, Miami, Florida. October , 1986

Fifth Annual Conference on Interactive Instruction Delivery, Society for Applied Learning Technology, Orlando, Florida. February, 1987

Adult Literacy and Technology Conference,
University Park, Pennsylvania. June, 1987

14th Annual Conference of the League for Innovation in the Community College,
San Francisco, California. October 1987

Interactive, 87, British Interactive Video Association (BIVA),
Brighton, England. December, 1987

Joint Technology Transfer Task Force, Chaired by Karl Haigler, U.S. Department of Education, Washington, D.C. January, 1988

Annual Conference of the American Association of Community and Junior Colleges,
Las Vegas, Nevada. April, 1988

Adult Literacy and Technology Conference,
Pittsburgh, Pennsylvania. July, 1988

Materials were also disseminated to a wide variety of interested educators. During the final eighteen months of the project, seventy-five copies of the Learning Style Survey videodiscs were made and distributed for demonstration and evaluation purposes (Appendix H - Learning Style Survey Users List). One hundred additional discs have been printed this year and are available for purchase through SETS, an educational videodisc publisher based in Orlando, Florida (Appendix I - CPCC/SETS Press Release) . FIPSE granted the project permission to market the videodisc and an agreement was reached with the North Carolina Attorney General's Office late in 1988 giving CPCC responsibility for creating a model contract for use in this arrangement and for future public/private marketing partnerships.

The READY Course has also received a great deal of interest from across the U.S. and Canada. The project team planned to write a brochure similar to the Learning Style Survey brochure explaining the program, but because of the unique features built into the courseware a demonstration diskette was produced instead. The demonstration diskette highlights all the lessons and gives the viewer first-hand experience with the courseware. Over fifty demonstration diskettes have been distributed to date. The READY Course has been successfully implemented at CPCC's ABLE Centers and at no charge at other literacy programs across the country (Appendix J - READY Course Users List).

CONTINUATION

In June, 1988, the North Carolina Department of Community Colleges granted CPCC and the Project READY staff over $200,000 for a twelve month project with the following major objectives:

- Install new instructional technologies at six community colleges within N.C.
- Develop six additional modules of the READY Course
- Evaluate use of the Learning Style Survey and the READY Course with North Carolina literacy students
- Develop and evaluate new reading courseware for adults who cannot read at all
- Transfer all the reading courseware designed by this project to CD-ROM

Dissemination of the project materials, particularly the READY Course has expanded well beyond the original six sites. This program as well as the new courseware for non-readers called the New Readers' Bookstore is being distributed at no charge to any N.C. community college with adequate computer hardware. The project staff has been making presentations at statewide and regional conferences to make sure all interested educators get the software. Because we are offering so much material at no charge, several colleges are purchasing computer hardware just to run our programs.

Both the READY Course and the New Readers' Bookstore use a great deal of digitized audio. In order to deliver these programs with audio on microcomputers, the project staff is experimenting with the use of CD-ROM technology. A Compact Disc containing all the reading courseware (nearly one hundred hours of instruction with two hours of running audio) will be pressed this spring. The CD technology is necessary in order to store and deliver the 80 MB of computer data the courseware uses. Plans are being developed right now to use CD-ROM drives in a network in order to deliver the reading courseware to several students working simultaneously on networked terminals.

New opportunities are available for Project READY to expand into the workplace literacy field. Since the READY Course format has been shown to be effective with any content, interest has been expressed by several major employers and organizations in the possibility of creating customized courseware using workplace specific topics. In February of this year Ron Pugsley, Chief of the U.S. Department of Education's Workplace Literacy Partnership Grant invited the project staff to present the READY Course and Learning Style Survey to the annual meeting of that program's project directors. The Department is very interested in getting more new technology applications into the workplace and Project READY is seen as one of the best ways for that to happen economically and quickly. Several employers represented in this group are currently talking with Project READY's Director about developing customized courseware specifically for their industries. CPCC plans to apply for a Workplace Literacy Partnership Grant in conjunction with two other North Carolina Community Colleges and one or more textile manufacturers. In addition, discussions are underway with a variety of industry and union officials in regard to using the READY Course format to develop customized courseware. A preliminary agreement has been reached with one of the nation's largest unions to begin a pilot study, developing a limited number of courses in three employment areas. Other development efforts with major national and international employers are being planned and could begin this year. Because of the emphasis being placed on workplace literacy by government and industry and its future impact on the American economy, this effort might be the most important result of this grant.

Appendix A

CENTRAL PIEDMONT COMMUNITY COLLEGE

LEARNING STYLE SURVEY (LSS)

INTERACTIVE VIDEODISC PROJECT

INSTRUMENT VALIDATION REPORT

Developed by

Dr. John A Gretes
Associate Professor of Curriculum and Instruction
The University of North Carolina at Charlotte
Charlotte, North Carolina

Tim Songer
Project READY Coordinator
Central Piedmont Community College
Charlotte, North Carolina

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LEARNING STYLE SURVEY EVALUATION EXECUTIVE SUMMARY

The Learning Style Survey is an interactive videodisc that has been designed at Central Piedmont Community College (CPCC), Charlotte, North Carolina to assess the preferred learning styles of low-literate adults. It is based on the Cognitive Style Interest Inventory--a widely used, paper-and-pencil based assessment instrument. Because of the experimental nature of this research tool, a three phase evaluation plan was developed and implemented. The basic approach was to prove that the Learning Style Survey is as valid and reliable as the Cognitive Style Interest Inventory for our audience, and to show that it was much more acceptable and useful for this group.

Phase 1

The first phase of testing took place at CPCC using a storyboard consisting of nearly 100 black and white photographs. The storyboard and script were developed to represent the short video sequences that precede each question in the assessment. Twenty-two students were asked to respond to the questions represented by the storyboard and later to respond to an oral presentation of the appropriate sections of the Cognitive Style Interest Inventory. The storyboard was revised five times and revisions were completed when the students' responses to the two separate sets of questions correlated at a .84 level (Pearson Product Moment Correlation Co-efficient).

Phase 2

The second phase of testing also took place at CPCC, this time

using the completed interactive videodisc. Over one hundred students participated in this evaluation. Again the students viewed the Learning Style Survey and completed the Cognitive Style Interest Inventory. Two groups were created randomly with one group completing the videodisc first and the other completing the paper-and-pencil test first. A minimum of five days passed between test administrations. This phase of the testing also showed a strong correlation (.74) between the two instruments. In addition, testing at this phase resulted in refining the computer program that operated the videodisc to eliminate any problems and streamline the presentation.

Phase 3

The third and final phase of the Learning Style Survey validation study took place in community colleges across the country. Over 500 students participated in nine cities (Charlotte, Cleveland, Chicago, Miami, Newark, Phoenix, Oakland, St. Louis, and Eugene, Oregon). Students were randomly assigned to four groups. Two groups completed both the Learning Style Survey and the Cognitive Style Interest Inventory with the only difference being which instrument was presented first. A third group took the Learning Style Survey twice. The final group took the Cognitive Style Interest Inventory twice. A minimum of five days separated the testing. The results again showed the strong validity and reliability of the Learning Style Survey.

For a self-report type of instrument, any correlation above .60 suggests strong validity. For the national field test, the Pearson Product Moment Correlation Co-efficient of Stability

and Equivalence was .68 (Groups 1 & 2, n = 195). The Test-Retest Reliability Correlation was .75 for the Cognitive Style Interest Inventory (Group 3, n = 76) and .78 for the Learning Style Survey (Group 4, n = 45). Cronback's ALPHA Test for Internal Consistency resulted in scores of .85 for Group 3 and .87 for Group 4. Both reliability and consistency scores were very strong and suggest that the Learning Style Survey is slightly more reliable over time and internally consistent for this audience than the Cognitive Style Interest Inventory.

Two final statistical tests (Factor Analysis and Multitrait/ Multimethod Matrix) show evidence of the construct validity of the Learning Style Survey. These tests suggest the presence of two factors, which are shown to be matched to preferences for visual or auditory learning materials. A questionnaire distributed to the field test participants showed that 80% of the respondents found the Learning Style Survey to be easier to complete than the Cognitive Style Interest Inventory, 100% found it to be more interesting, and 85% said they would recommend it to a friend.

The most interesting data that resulted from the national field test show that 60% of the participants who read below a ninth grade level had a strong preference for auditory materials. By contrast, 60% of the participants reading at a high school level preferred visual materials. Further research and development is suggested by these findings to produce more literacy materials that have auditory capabilities (few are available at present). Also, these findings point to the need to better understand how learning processes are effected by the ability to read and comprehend at a functional level.

CENTRAL PIEDMONT COMMUNITY COLLEGE

LEARNING STYLE SURVEY (LSS)

INTERACTIVE VIDEODISC PROJECT

Phase I Report

Instrument Development and Learner Tryout

Developed by:

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June, 1987

INTRODUCTION

This Phase I Report will describe the following videodisc development procedures:

1. Use of the Hill Cognitive Style Interest Inventory;
2. Development of the Videodisc version for the Learning Style Survey;
3. Learner tryout procedures; and
4. Learner tryout results and conclusions.

USE OF THE HILL COGNITIVE

STYLE INTEREST INVENTORY

Since the mid 1970's, Central Piedmont Community College has used the Hill Cognitive Style Interest Inventory as a diagnostic tool for students. Students have completed the paper-pencil version of the instrument and their results have been used to help them understand more about their personal learning style.

The major types of learning styles identified by the Hill instrument include the following theoretical symbols:

1. Auditory Linguistic. The symbol represents a preference for the student to acquire and communicate meaning through the spoken word. This is the ability to find meaning from hearing spoken words. It focuses on language input by hearing.

   Usually someone who has a high Auditory Linguistic (AL) score on the instrument has a better than average ability in the area of auditory comprehension.

2. Auditory Quantitative. This symbol represents a preference for the student to acquire and communicate meanings through the spoken word. This is the ability to find meaning from hearing numbers. It focuses on quantitative input by hearing.

   Usually someone who has a high Auditory Quantitative (AQ) score on the inventory has a better than average ability with the auditory comprehension of numbers.

3. Visual Linguistic. This symbol represents a preference for the student to acquire and communicate through the written word. This is the ability to find meaning from the words he or she sees. It focuses on language input by sight.

   Usually someone who has a high Visual Linguistic (VL) score on the inventory reads with better than average comprehension.

4. Visual Quantitative. This symbol represents a preference for the student to acquire and communicate through written numbers. This is the ability to find meaning from the number he or she sees. It focuses on quantitative input by sight.

> Usually someone who has high Visual Quantitative (VQ) score on the inventory has a better than average ability with written numbers. (Hill, 1970)

NOTE: The complete Hill Cognitive Style Interest Inventory is reproduced in Appendix E.

These four theoretical symbols are determined by responses to 32 items on the Hill instrument. Listed below are the two letter codes for each theoretical symbol and the respective items from the Hill inventory:

COGNITIVE STYLE INTEREST INVENTORY

Items By Theoretical Symbol Code

AL = Auditory Linguistic
AQ = Auditory Quantitative
VL = Verbal Linguistic
VQ = Verbal Quantitative

AL 1. After I write a letter, I read it aloud so that I know how it sounds.

AQ 2. When taking courses in mathematics, I find it easy to "talk in formulas" with my classmates and teacher.

VL 3. I score high on achievement tests which depend upon reading comprehension.

VQ 4. When I am in a group of people trying to solve a written mathematical problem, I am among the first to reach a correct solution.

VL 5. My written explanations are easily understood.

AL 6. I do best on a test if it covers information I have discussed.

VL 7. I prefer classes which rely heavily on textbooks for information.

VQ 8. I use a written record to account for money for which I am responsible.

AL 9. I make it a point to listen to the news on the radio.

AL 10. I communicate with friends and colleagues by telephone.

VL 11. I refer to or read a map when I am going to a strange place.

AL 12. I prefer verbal directions for finding a strange place.

VQ 13. If I were buying a car, I would ask the salesman to write out or show me the printed engine specifications.

AL 14. I like people to talk to me about what they mean.

AQ 15. I discuss "sale" prices with others before I go shopping.

AQ 16. I can remember a telephone number once I have heard it.

VQ 17. I write a telephone number down to remember it.

AL 18. My friends like to listen to my explanations of difficult concepts.

VL 19. I read the newspaper to find out the daily news.

AL 20. I prefer to have verbal directions for new activities.

VL 21. I read directions when I must assemble something or make something.

AQ 22. I like verbal (oral) tests in mathematics.

VQ 23. When I go shopping, I read the price of each item and keep a running total in my head.

AQ 24. I quote statistical data to others in order to prove my point in an argument.

AQ 25. I find it comfortable to add spoken or dictated numbers mentally.

VL 26. I prefer to acquire information by reading about it.

VQ 27. I achieve best on written mathematics tests.

VL 28. After I dictate a letter, I read it to be certain it is correct.

AQ 29. It is easy for me to remember the numbers and formulas I have heard during a conversation.

VQ 30. I keep accurate written records in my check book.

AQ 31. If I were buying a car, I would discuss the engine specifications with the salesman or a friend.

VQ 32. I solve mathematical problems more rapidly if they are written.

Although the Hill instrument includes a total of 224 items that represent theoretical symbols, qualitative symbols, cultural determinants, and modalities of inference, only the above 32 theoretical symbols items were used in the LSS Videodisc project. The 32 theoretical symbol items were selected for use by the ABLE center staff director and the LSS project director. Responses to these items, it was felt, would provide scores on the AL, AQ, VL, and VQ aspects of cognitive style that could be used to help place students in the types of instructional material with the greatest chance of success for the student. A complete listing of the four aspects of cognitive style measured by the Hill instrument are presented in Appendix F.

DEVELOPMENT OF THE VIDEODISC VERSION

Based on the 32 items selected from the Hill instrument, a set of video scenarios were developed. Appendix D contains a copy of the first video script. The script was made up of 32 scenarios which lead to a question to the student. To properly develop the script in a logical sequence, the items from the paper-pencil version of the Hill instrument were modified and reordered. The videodisc scenarios were revised during the learner tryout component of the project. To develop materials for use in the learner tryout, 35mm prints were taken to represent each video scenario. These prints were pasted-up into a booklet and the questions were added at the end of each scenario. The video script booklet was used in the learner tryouts to simulate the videodisc version of the instrument. An instructor from the ABLE Program was trained in proper student tryout techniques and she conducted each session.

LEARNER TRYOUT PROCEDURES

In order to implement the learner tryouts, five different surveys were developed. A random sample of ABLE Center students was selected to complete a series of survey sequences. Appendix B contains a copy of the audience analysis used in the development process of the LSS project. Each survey is explained below:

Survey #1 - The original 32 items from the Hill Cognitive Style Interest Inventory

Survey #2 - A rewrite of the original 32 items from the Hill Cognitive Style Interest Inventory

Survey #3 - Videodisc Booklet with written questions

Survey #4 - Videodisc Booklet without written questions

Survey #5 - Revised Videodisc Booklet with written questions

* (Appendix C contains a copy of the original Learner Tryout Implementation Plan.)

(NOTE: Survey #5 was developed based on feedback from the earlier survey results.)

A staff member, Laura Beam, from the ABLE Center administered all tryout materials. She read Survey 1 or 2 to the student, recorded their responses, then read the Survey 3 or 4 materials to the student and recorded the responses. Upon completion of the surveys, she completed two different questionnaires. Questionnaire #1 was completed based on her judgment of the student performance. The second questionnaire (#2) was used by her to gain information directly from the students. Appendix D contains copies of both questionnaires.

The following patterns of survey administration were separated in time by one working day:

Number of Students Completing Surveys	Sequence of Surveys Completed
5	1 and 3
3	1 and 4
6	2 and 3
2	2 and 4

Based on a review of the student questionnaire responses and comments from the staff member who supervised the tryout, Survey #5 was developed and administered. The following patterns of survey administration were separated in time by one working day:

Number of Students Completing Surveys	Sequence of Surveys Completed
3	1 and 5
3	2 and 5

Responses to Questionnaires #1 and #2 were collected and used to make revised videodisc script.

LEARNER TRYOUT

RESULTS AND CONCLUSIONS

Questionnaire Results

The responses to Questionnaire #1 were analyzed in two groups. The results of the first group are summarized in Exhibit 1.1. The results of the second group of questions is reported in Exhibit 1.2.

Conclusions drawn from the data reported in Exhibit 1.1 are general in nature and suggest the following:

- For the most part, the reading and listening levels of the survey items seemed appropriate for the students. The questions that did cause problems are reported in Exhibit 1.2. When these questions were rewritten and used in Survey #5, they were not identified as problems.
- None of the survey questions were reported as being intimidating, condescending or culturally offensive.
- The Videodisc Booklet seemed to hold the student's attention and was not confusing or misleading to students. The Videodisc Booklet did seem to add to the student's experience.
- On a few questions, students asked to change their answers. These questions are reported for Surveys 3, 4, and 5 in Exhibit 1.2. As revisions were completed on survey questions, identification of these as problem questions by students reduced. Note the reduced number of questions identified as difficult or confusing for Survey 5 on Exhibit 1.2.

- In response to the items on Questionnaire #2, students identified Survey #5 as being the easiest for them to understand. They also identified Survey #5 as being the most interesting.

Exhibit 1.1

General Response Patterns for Questionnaire #1

Items 1, 2, 5, 6, 7, 9, 10, and 11

---

1. Is the reading level appropriate?

   For all surveys, the reading level seemed appropriate, given that questions on surveys 1 and 2 were read to the students, and that surveys 3, 4, and 5 scenarios were also presented orally.

2. Is the vocabulary appropriate for the listening level?

   See responses to Questions 3, 4, 8, 12, and 13 in Exhibit 2.

5. Are any of the questions intimidating, condescending, or culturally offensive?

   In all cases, the responses to this question was no.

6. Does the disc (videodisc booklet) hold the participants interest?

   In all cases, the response to this question was yes.

7. Is there a point at which the participant's interest begins to fade? If so, where?

   In all cases, the response to this question was no.

9. Does the story line (of the scenarios) confuse or mislead the participants?

   In all cases, the response to this question was no.

10. In your opinion, did the use of the story line (in the videodisc booklet) add or detract from the participant's overall experience?

    In all cases, the response to this question was that it seemed to add to the overall experience.

11. Did the participant attempt or request to change an answer?

    Less than 20% of the participants requested to change an answer.

Exhibit 1.2

Responses to Selected Items on Questionnaire #1

Identifying Problem Questions By Survey Completed *

Questionnaire Item Number		Problem Questions Identified on Survey # 3	4	5
3.	Items student found to be difficult to understand	13, 19, 23	6, 16, 25	None
4.	Items that might bias the student's responses	6, 11, 32	6, 7, 19, 21	None
8.	Items that did not fit with the visual theme	5, 6, 13, 16, 23, 24	13	None
12.	Items that sound particularly difficult	2, 6, 14, 16, 21, 28, 32	2, 6, 12, 16, 19, 24, 29	2, 6, 19
13.	Items that took longer to complete	6, 12, 13, 16	6, 9, 23, 24, 25	5, 21, 23

Exhibit 1.3

Responses to Questionnaire #2

Question Number		N = 6			N = 4			N = 5		
		#3	#1	Both	#4	#1	Both	#5	#1	Both
1.	Which survey was easier for you to understand?	67%	0%	33%	50%	0%	50%	80%	0%	20%
2.	Which survey was more interesting?	17%	50%	33%	75%	0%	25%	100%	0%	0%

Survey Correlations

Student scores on the four aspects of cognitive style for each survey were correlated based on the sequence of administration. With the use of Surveys 1 through 4, the following correlation quoeficients were calculated:

Survey Sequence	Correlation
1 and 3	.34
1 and 4	.80
2 and 3	.48
2 and 4	.11

Using the information from the completed questionnaires, another revision was made in the Videodisc Script Booklet and the following correlation was obtained:

Survey Sequence	Correlation
1 and 5	.84

The correlations improved between Survey 1 and the revisions in Surveys 3, 4, and 5. Survey #5 had the highest correlation to the original 32 paper-pencil items from the Hill Cognitive Style Interest Inventory. The questions and scenarios used in Survey #5 were used without further revision in the final LSS videodisc.

Conclusions and Recommendations

- Use of questionnaire data to make changes in each respective survey seemed to improve the survey from the standpoint of identified student problems with specific questions as well as with improvements in the correlations.

- Student responses to Questionnaire #2 seem to indicate an overall preference for Survey #5 over #'s 3 and 4.
- The rewrite of Survey #1 questions to produce Survey #2 did not seem to improve the usefulness of the questions. The project should continue to use Survey #1 as the paper-pencil version of the LSS for Phases II and III of the project.
- Survey #5 (the current revised video script) should be used in Phase II of the project, and questionnaire and other data should be collected to monitor its performance.
- Questionnaires #1 and #2 should be revised and used in Phase II of the Project.
- Survey #1 and the Videodisc version (Survey #5) should be used (as they are) in Phase II of the project since based on the correlation between the two, students seemed to perform at about the same level on both versions (conclusion = .84). Correlations between both versions should be calculated in Phase II in order to determine if changes take place once students use the Interactive Video System.
- In Phase II, reliability-stability over time should be determined as well as split half reliability on both versions of the instrument.

CENTRAL PIEDMONT COMMUNITY COLLEGE

LEARNING STYLE SURVEY (LSS)

INTERACTIVE VIDEODISC PROJECT

Phase II Report

Local Field-Test

Developed by:

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INTRODUCTION

During the Phase II local field test, the different student groups at CPCC were asked to do the paper-pencil version of the Cognitive Style Interest Inventory (CSII) during different time periods. In addition, some students took the videodisc version of the inventory. In order to determine the reliability of the paper-pencil version, a group of students was asked to take the instrument twice within a three to five day period. Table 2.1 displays the results of the test-retest reliability for the paper-pencil version.

Based on the information displayed in Table 2.1, 9 of the 16 subjects were at the high school reading level, and 6 subjects ranged in reading level from 8.7 to 9.0, or eight grade seventh month to ninth grade zero months. The only negative correlation was for the student reading at the 3.9 level. The students reading at the high school level generated test-retest correlations ranging from .83 to .99, while those reading at the 8.7 to 9.0 level generated correlations of .33 to .98. The one student reading below fourth grade level generated a correlation of -.58. The column identified as "Match?" identifies if the students test-retest factor scores identified the same Cognitive Style as dominant. In 81% of the cases, there was a match between the test and the retest identification of the same dominant Cognitive Style. The total group paper-pencil test-retest correlation was .58.

Table 2.2 displays the test-retest correlations for the videodisc version of the CSII for each subject and for the total group. Two of the subjects were reading at the high school level, eight were reading between the 4.0 and 7.2 level, and seven were reading below the fourth grade level.

Table 2.1

Test-Retest Reliability of the Paper-Pencil Version of the CSII: Subject by Subject and Total Group

n = 16

Subject Number	Reading Level	Correlation	Match?
1	HS	.99	Yes
2	HS	.94	Yes
3	HS	.93	Yes
4	HS	.97	Yes
5	HS	.97	Yes
6	HS	.97	Yes
7	HS	.87	Yes
8	HS	.86	No
9	HS	.83	Yes
10	9.0	.92	Yes
11	9.0	.95	Yes
12	9.0	.98	Yes
13	9.0	.71	Yes
14	9.0	.33	Yes
15	8.7	.67	No
*16	3.9	-.58	No

No Match = 3

81% Match in the identification of one of the four Cognitive Styles as dominant test to retest

Total Group: r = .58

Table 2.2

Test-Retest Reliability of the Videodisc Version of the CSII: Subject by Subject and Total Group

n = 17

Subject Number	Reading Level	Correlation	Match?
1	HS	.92	Yes
2	HS	.86	No
3	7.2	.54	No
4	7.0	.97	Yes
5	6.6	.55	Yes
6	5.5	.58	Yes
7	4.8	.66	Yes
8	4.7	.26	Yes
9	4.0	.88	Yes
10	4.0	.87	Yes
11	3.8	-.16	Yes
12	3.7	.58	Yes
13	3.7	-.77	No
14	3.5	.78	Yes
15	3.5	.32	Yes
16	3.5	.26	No
17	3.5	-.47	No

No Match = 5

71% Match in the identification of one of the four Cognitive Styles as dominant pre to posttest

Total Group: r = .72

The correlations for those reading at the high school level ranged from .86 to .92, those for the students reading between the 4.0 and 7.2 level ranged from .26 to .97, and for the students reading below the fourth grade level, the correlations ranged from -.77 to .78. All three of the negative correlations were for students reading below the fourth grade level. Five of the 20 students generated a mismatch in the identification of a dominant Cognitive Style and overall 71% generated a match. Three of five generating a mismatch were reading below the fourth grade level. The test-retest correlation for the total group was .72.

Table 2.3 displays the results of the paper-pencil to videodisc correlations for each student and for the total group. Five of the 20 students were reading at the high school level and 15 were reading between the 5.2 and the 9.0 level. The correlations for those reading at the high school level ranged from -.55 to 1.00 and the correlations for those reading between the 5.2 and the 9.0 level ranged from -.50 to 1.00. In this group, there were two negative correlations and two 100% correlations. Five of the students generated a mismatch in the identification of a dominant Cognitive Style and 15 (75%) generated a match. The correlation between the paper-pencil and the videodisc versions was .77 for the total group.

CONCLUSIONS

The following conclusions are based on the information displayed in Tables 2.1, 2.2, and 2.3:

1. The videodisc test to retest correlation at .72 is higher than that for the paper-pencil test to retest correlation of .58;

Table 2.3

Paper-Pencil to Videodisc Correlation: Subject by Subject and Total Group

n = 20

Subject Number	Reading Level	Correlation	Match?
1	HS	.98	Yes
2	HS	.51	Yes
3	HS	.95	Yes
4	HS	1.00	Yes
5	HS	-.55	No
6	9.0	1.00	Yes
7	8.7	.98	Yes
8	8.4	-.50	No
9	8.0	.64	No
10	8.0	.11	Yes
11	8.0	.89	Yes
12	7.8	.63	Yes
13	7.5	.41	No
14	7.3	.89	Yes
15	7.2	.96	Yes
16	7.2	.97	Yes
17	7.2	.16	No
18	6.9	.97	Yes

Table continues

Subject Number	Reading Level	Correlation	Match?
19	5.7	.77	Yes
20	5.2	.91	Yes

No Match = 5

75% Match in the identification of one of the four Cognitive Styles as dominant.

Total Group: r = .77

2. There seems to be a solid match in the identification of one dominant Cognitive Style for the paper-pencil to paper-pencil (81%), videodisc to videodisc (71%), and the paper-pencil to videodisc (75%) comparisons;
3. There seems to be a problem using either the paper-pencil or the videodisc version with students reading below the fourth grade level based on the number of negative correlations for that group. NOTE: Based on our experience with the Phase I portion of this project, it is difficult to gather accurate information from the paper-pencil version of the CSII for students reading below the fourth grade level. Students reading below the fourth grade level report being able to understand the videodisc version better than the paper-pencil instrument. For this reason, it is difficult to obtain reliable information from those students reading below the fourth grade level. We hope to be able to use the videodisc version to identify a dominant Cognitive Style for those reading below the fourth grade level and then to follow their performance through different materials to determine the success of the videodisc version in accurately predicting their Cognitive Style; and
4. The paper-pencil to videodisc correlation of .77 seems to be accurate given the fact that none of the students involved as subjects were reading below the fourth grade level. It is interesting to note that this was the only one of the three tables that generated two correlations of 100% for individual students.

CENTRAL PIEDMONT COMMUNITY COLLEGE

LEARNING STYLE SURVEY (LSS)

INTERACTIVE VIDEODISC PROJECT

Phase III Report

National Field-Trials

Developed By:

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October 12, 1987

National Field-Trial Procedures

Ten locations were selected for the national field-trials of the Learning Style Survey (LSS) and the Cognitive Style Interest Inventory (CSII). These locations included:

1. Brookdale Community College
   Lencroft, New Jersey

* 2. Central Piedmont Community College
   Charlotte, North Carolina

* 3. Cuyohoga Community College
   Cleveland, Ohio

* 4. Lane Community College
   Eugene, Oregon

* 5. Maricopa Community College
   Phoenix, Arizona

* 6. Miami-Dade Community College
   Miami, Florida

7. Moraine Valley Community College
   Palos Hills, Illinois

* 8. Peralta Community College
   Alameda, California

* 9. St. Louis Community College
   St. Louis, Missouri

10. University of Arkansas
    Springdale, Arkansas

(See Appendix I for complete information on each location)

Of the ten selected sites, seven were involved in the actual field-trials. The seven that participated are identified with an asterisk (*). Each of the seven institutions was provided with the CSII, optical scan answer sheets, the LSS videodisc and "B" drive data collection disks, "A" drive program discs, student demographic forms, and student comment sheets.

The Phase III field-trial procedures represented a modified version of the Phase II procedures. Each location was asked to collect and report data according to the following guidelines.

LEARNING STYLE SURVEY

PHASE III FIELD TEST PROCEDURES

OVERVIEW

STUDENT TREATMENT GROUPS	TREATMENT	
GROUP ~~A~~ 1	Paper/Pencil <3-5 Days> Video	
Minimum of 30 Students		Comment Sheets Part 1 & 2
GROUP ~~B~~ 2	Video <3-5 Days> Paper/Pencil	
Minimum of 30 Students	Comment Sheet Part 1	Comment Sheet Part 2
GROUP ~~C~~ 3	Paper/Pencil <5-10 Days> Paper/Pencil	
Minimum of 20 Students	No Comment Sheet	
GROUP ~~D~~ 4	Video <5-10 Days> Video	
Minimum of 20 Students		Comment Sheet Part 1

STUDENT INFORMATION NEEDED

1. Name
2. Age

3. Race
4. Sex
5. Reading Level

RETURN TO CPCC

1. "B" Drive Diskette
2. Computer Answer Sheets
3. Student Demographics Forms
4. Student Comment Sheets

Student treatment groups 1 and 2 were combined with one-half of the students taking the video (LSS) first and the other half taking the paper-pencil (CSII) first. Field-trial locations were asked to use typical community college Adult Basic Education (ABE) or English as a Second Language (ESL) students representative of their own student populations.

National Field-Trial Demographics

Table 3.1 displays the national field-trial demographic data. The seven locations are identified as "sources" and the percentage of the total sample represented by each source. Age ranges by percentage of the total sample are listed under the heading "Age." The majority of students reporting age ranges were from 16 to 20 years old. Unfortunately, 26% of the respondents did not report an age range. The sample was made up of 24% White, 43% Black, 27% Hispanic, and 6% Asian students, and is identified under the heading titled "Race." Individuals in the sample were 33% male and 54% female students with some 13% not identified according to "Sex." As for reading level, 17% were identified as reading at the 4-6 grade level, 47% were identified as reading at the 7-9 grade levels, and 36% identified as reading at the 10-12 grade levels.

Reliability

Table 3.2 displays reliability data for the video and paper-pencil versions of the instrument. A .68 was the video to paper-pencil

Table 3.1

National Field-Trial Demographics

n = 316

Demographic		% Sample
Source		
1.	CPCC	21
2.	Cuyahoga	10
3.	Peralta	15
4.	St. Louis	7
5.	Lane	14
6.	Maricopa	3
7.	Miami-Dade	30
	Total:	100
Age		
16 to 20		20
21 to 25		18
26 to 30		13
31 to 35		7
36 to 40		6
41 to 45		5
46 to 50		2
51 to 55		1
Over 55		2
N. R.		26
	Total:	100
Race		
White		24
Black		43
Hispanic		27
Asian		6
	Total:	100

(table continues)

Demographic		% Sample
Sex		
Male		33
Female		54
N. R.		13
	Total:	100
Reading Level		
4th		4
5th		7
6th		6
7th		10
8th		21
9th		16
H.S.		36
	Total:	100

Table 3.2

National field-Trial Reliability for The Video and Paper-Pencil Versions

n = 316

Video Format to Paper Pencil Correlations (n = 195)

	Correlation of Stability and Equivalence
(AL)	= .58
(AQ)	= .39
(VL)	= .61
(VQ)	= .69
(T) All 32 items	= .68

Paper-Pencil to Paper-Pencil Correlations (n = 76)

	Test-Retest Reliability	Cronback's ALPHA Internal Consistency
(AL)	= .57	.78
(AQ)	= .69	.80
(VL)	= .73	.84
(VQ)	= .61	.78
(T)	= .75 (32 Items)	.85

(table continues

Video to Video Correlations (n = 45)

	Test-Retest Reliability	Cronback's ALPHA Internal Consistency
(AL)	= .70	.84
(AQ)	= .76	.86
(VL)	= .70	.83
(VQ)	= .69	.82
(T)	= .78	.87

correlation. This correlation provides evidence of equivalence. By style, the conclusions were .58, .39, .61, and .69 respectively for audio-linguistic, audio-quantitative, visual-linguistic, and visual-quantitative..

Stability over time for the paper-pencil version (CSII) was .75 with an internal consistency of .85. The stability over time for the video version (LSS) was .78 with an internal consistency of .87. The video version would appear to be slightly more stable and internally consistent.

Validity

Table 3.3 displays factor analysis and correlations for the video and the paper-pencil revisions. Using SPSS subprogram, Factor Analyses, with oblique rotation, the four video version styles loaded at .30 or higher into two separate factors. The AL and AQ styles loaded into factor 2 while the VL and VQ styles loaded into factor 1. These loadings provide some evidence of two constructs, namely auditory and visual. The video format correlations based on the factor analyses identify high positive correlations between AL and AQ styles, VL and VQ styles, and with high positive correlations between AL and VL and AQ and VQ styles.

For the paper-pencil version (CSII), the AL style loaded into factor 2, the AQ style loaded into both factors 1 and 2, the VL and VQ styles loaded into factor 1. The paper-pencil format correlations identified high positive correlations between the AL and AQ styles, VL and VQ styles, and between the VQ and AQ styles.

Table 3.4, the multitrait, multimethod matrix displays Pearson correlations between the four styles (AL, AQ, VL, VQ) and the two methods (video and paper-pencil). This matrix provides some support for the

Table 3.3

National Field-Trials Factor Analyses for the Video and Paper-Pencil Versions

n = 195

Video Format Factor Pattern

		Factor 1	Factor 2
(AL)	Auditory Linguistic	-.05	.56
(AQ)	Auditory Quantitative	.24	.71
(VL)	Visual Linguistic	.52	-.02
(VQ)	Visual Quantitative	.84	.08

Video Format Correlations

	(AL)	(AQ)	(VL)	(VQ)
(AL)	1.00	.43	.11	.21
(AQ)	.43	1.00	.27	.56
(VL)	.11	.27	1.00	.44
(VQ)	.22	.56	.44	1.00

Paper-Pencil Format Factor Pattern

		Factor 1	Factor 2
(AL)	Auditory Linguistic	-.07	.52
(AQ)	Auditory Quantitative	.34	.63
(VL)	Visual Linguistic	.55	-.05
(VQ)	Visual Quantitative	.82	.09

(table continues)

Paper-Pencil Format Correlations

	(AL)	(AQ)	(VL)	(VQ)
(AL)	1.00	.35	.04	.13
(AQ)	.35	1.00	.26	.53
(VL)	.04	.26	1.00	.45
(VQ)	.13	.53	.45	1.00

Table 3.4

National Field-Trial Multitrait/Multimethod Matrix

n = 195

	Method 1 Video Format				Method 2 Paper-Pencil Format			
	Var. 07 (AL)	Var. 08 (AQ)	Var. 09 (VL)	Var. 10 (VQ)	Var. 11 (AL)	Var. 12 (AQ)	Var. 13 (VL)	Var. 14 (VQ)
(Video)								
Var. 07 (AL)	1.00	.43	.11	.22	.58	.36	.07	.23
Var. 08 (AQ)	.43	1.00	.27	.56	.28	.39	.20	.38
Var. 09 (VL)	.11	.27	1.00	.44	-.06	.21	.61	.45
Var. 10 (VQ)	.22	.56	.44	1.00	.09	.48	.30	.69
(Paper-Pencil)								
Var. 11 (AL)	.58	.28	-.06	.09	1.00	.35	.04	.13
Var. 12 (AQ)	.36	.39	.21	.48	.35	1.00	.26	.53
Var. 13 (VL)	.07	.20	.61	.30	.04	.26	1.00	.45
Var. 14 (VQ)	.23	.38	.45	.69	.13	.53	.45	1.00

Exhibit 3.1

Final Version Video and Paper-Pencil Item Match

	Video Items		Paper-Pencil Items
1.	Do you try to listen to the radio?	9.	I make it a point to listen to the news on the radio.
2.	If you ask someone to write something down, do you read it to make sure it's right?	28.	After I dictate a letter, I read it to be certain it is correct.
3.	Do you understand things better after you talk about them?	6.	I do best on a test if it covers information I have discussed.
4.	Are your written messages easy to understand?	5.	My written explanations are easily understood.
5.	Do you talk about price with others before you buy something?	15.	I discuss "sale" prices with others before I go shopping.
6.	When someone talks to you about numbers, is it easy for you to understand what they mean?	22.	I like verbal (oral) tests in mathematics.
7.	Do you use a map when you go new places?	11.	I refer to or read a map when I am going to a strange place.
8.	Do you like to learn new things by reading about them?	26.	I prefer to acquire information by reading about it.
9.	Do you write a telephone number down to remember it?	17.	I write a telephone number down to remember it.
10.	When you go to a new place, do you ask for directions?	12.	I prefer verbal directions for finding a strange place.
11.	Do you talk to your friends on the phone?	10.	I communicate with friends and colleagues by telephone.

(table continues)

Video Items	Paper-Pencil Items
12. Do you solve written math problems faster than other people?	4. When I am in a group of people trying to solve a written mathematical problem, I am among the first to reach a correct solution.
13. Do you find it easy to talk about numbers?	2. When taking courses in mathematics, I find it easy to "talk in formulas" with my classmates and teacher.
14. Do you solve math problems faster when they are written?	32. I solve mathematical problems more rapidly if they are written.
15. When you are learning something new, would you choose to use books?	7. I prefer classes which rely heavily on textbooks for information.
16. Are you good at explaining things to others?	20. I prefer to have verbal directions for new activities.
17. Before you try new things, do you like to have people explain them to you?	18. My friends like to listen to my explanations of difficult concepts.
18. Do you read the newspaper to find out the daily news?	19. I read the newspaper to find out the daily news.
19. When talking with a friend, do you like to use numbers to prove your point?	24. I quote statistical data to others in order to prove my point in an argument.
20. When you get to the store, do you read the prices and try to keep a running total in your head?	23. When I go shopping, I read the price of each item and keep a running total in my head.
21. Is it easy for you to add numbers when you hear them?	25. I find it comfortable to add spoken or dictated numbers mentally.

(exhibit continues)

Video Items		Paper-Pencil Items	
22.	Do you keep written records of how you spend your money?	8.	I use a written record to account for money for which I am responsible
23.	Is it easy for you to remember numbers you have heard in a conversation?	29.	It is easy for me to remember the numbers and formulas I have heard during a conversation.
24.	If you were buying a car, would it help you to see the monthly payments written down?	13.	If I were buying a car. I would ask the salesman to write out or show me the printed engine specifications.
25.	Would you ask the salesman to explain the monthly payments.	31.	If I were buying a car, I would discuss the engine specifications with the salesman or a friend.
26.	Do you like people to explain what they mean?	14.	I like people to talk to me about what they mean.
27.	Can you remember a telephone records in my check book.	16.	I can remember a telephone number once I have heard it.
28.	After you write a letter, do you read it out loud to hear how it sounds?	1.	After I write a letter, I read it aloud so that I know how it sounds.
29.	Do you keep correct records of your bills?	30.	I keep accurate written records in my checkbook.
30.	Do you read the directions when you put something together?	21.	I read directions when I must assemble something or make something.
31.	Do you prefer to work out math problems on paper?	27.	I achieve best on written mathematics tests.
32.	When you read something, do you understand what it means?	3.	I score high on achievement tests which depend upon reading comprehension.

Table 3.5

National Field-Trial Percentage of Auditory and Visual Learners by Reading Level

Reading Level	% Auditory	% Visual	Total % of Sample
Elementary (4, 5, 6)	60	40	17
Junior High (7, 8, 9)	57	43	47
High School (10, 11, 12)	40	60	36
	51	49	100

content validity. There is a one to one match up between the LSS and CSII items.

Results

With the knowledge that the LSS is at least as valid and reliable as the CSII, the results of the national field-trials can be examined based on the LSS.

Table 3.5 displays the results of a cross-tabulation in percentages between auditory and visual learners by reading level. Overall, 51% of the sample were identified as visual learners. Of those reading at the elementary school level, the majority (60%) were identified as auditory learners. The majority of students reading at the jr. high level were identified as being auditory learners (57%), while 43% were identified as visual learners. The majority of students reading at the high school level were identified as visual learners (60%) with 40% identified as auditory learners.

Based on the field-trial sample, Table 3.6 displays the percentage of students by race and their respective reading levels. The majority of White students were reading at the jr. high or high school level, 45% and 46% respectively. Similar percentages are reported for Black students. Among Hispanic students, 12% were reading at the elementary level, 36% at the jr. high level, and 51% at the high school level. The majority of Asian students in the sample were reading at the elementary level (50%), while 33% were at the jr. high level, and only 17% were at the high school level.

The next two Tables 3.7 and 3.8 display data based on dominant styles as measured by the LSS. In Table 3.7, dominant style (AL, AQ, VL, VQ) is

Table 3.6

National Field-Trial Percentage of Participant Reading Level by Race

n = 316

Race	% Reading Level		
	Elementary (4, 5, 6)	Jr. High (7, 7, 9)	High School (10, 11, 12)
White	9	45	46
Black	8	44	48
Hispanic	12	36	51
Asian	50	33	17

Race	% Grade Level/Reading							
	4th	5th	6th	7th	8th	9th	H.S.	% Total
White	2	2	5	8	22	15	46	24
Black	2	3	3	13	13	18	48	43
Hispanic	0	6	6	15	6	15	51	27
Asian	0	25	25	0	8	25	17	6

Table 3.7

National Field-Trial Crossmatch of Videodisc Results: Race by Dominant Learning Style by Reading Level

n = 152

		Dominant Learning Style									
Race	Reading Level	AL		AQ		VL		VQ		Total	
		#	%	#	%	#	%	#	%	#	%
White	Elem	3	38	0	0	3	38	2	24	8	100
	Jr. High	16	57	2	7	7	25	3	11	28	100
	H.S.	6	26	3	13	9	39	5	22	23	100
	Total (W)	25	42	5	8	19	32	10	18	59	100
Black	Elem	3	60	0	0	0	0	2	40	5	100
	Jr. High	14	61	0	0	6	26	3	13	23	100
	H.S.	8	40	1	5	7	35	4	20	20	100
	Total (B)	25	52	1	2	13	27	9	19	48	100
Hispanic	Elem	4	66	0	0	2	33	0	0	6	100
	Jr. High	6	38	1	6	3	18	6	38	16	100
	H.S.	5	38	0	0	4	31	4	31	13	100
	Total (H)	15	43	1	3	9	26	10	28	35	100
Asian	Elem	4	66	1	17	0	0	1	17	6	100
	Jr. High	1	33	0	0	1	33	1	33	3	100
	H.S.	0	0	0	0	1	100	0	0	1	100
	Total (A)	5	50	1	10	2	20	2	20	10	100
All Races	Total	70	46	8	6	43	28	31	20	152	100

Table 3.8

National Field-Trial Videodisc (LSS) Results: Race by Reading Level by Auditory Visual and Linguistic/Quantitative Dominance

n = 152

		% Dominance		A/L and L/Q	
Race	Reading Level	Auditory	Visual	Linguistic	Quantitative
White	Elem	38	62	76	24
	Jr. High	64	36	82	18
	H.S.	39	61	65	35
Total (Whites)		52	48	72	28
Blacks	Elem	60	40	60	40
	Jr. High	61	39	87	13
	H.S.	45	55	75	25
Total (Blacks)		54	46	79	21
Hispanics	Elem	66	33	100	0
	Jr. High	44	56	56	34
	H.S.	38	62	69	31
Total (Hispanics)		50	50	71	29
Asians	Elementary	83	17	66	34
	Jr. High	33	66	66	34
	H.S.	0	100	100	0
Total (Asians)		47	53	60	40
% Race Totals		52	48	74	26

displayed by race and reading level. For Whites in the sample, those reading at the elementary level were split between AL-38%, VL-38%, and VQ 24%. At the jr. high reading level, the AL style was dominant (57%), while at the high school level, the majority (39%) were identified as VL dominant style.

For Blacks in the sample, all reading levels were identified as AL dominant. Blacks reading at the high school level were identified as 40% AL dominant and 35% VL dominant. Overall, Blacks were 52% AL dominant.

Hispanics reading at the elementary level were identified as 66% AL dominant and 33% VL dominant. At the jr. high level, Hispanics were 38% AL, 6% AQ, 18% VL, and 38% VQ dominant. At the high school level, Hispanics were 38% AL, 0% AQ, 31% VL, and 31% VQ dominant. Overall, Hispanics were 43% AL dominant.

Among the Asians in the sample, overall, 50% were AL, 10% were AQ, 20% were VL, and 20% were VQ dominant. At the elementary level, 66% were AL, 17% were AQ, and 17% were VQ dominant. At the jr. high level, they split evenly between AL, VL, and VQ dominance, while at the high school level, 100% were VL dominant.

Table 3.8 displays results of a cross-match between A/V/L/Q dominance and race and reading level. Here the totals by race present some insight. For Whites, 52% were auditory dominant and 72% linguistic dominant. Among Blacks, 54% were auditory dominant, and 79% were linguistic dominant. For the Hispanics in the sample, there was an even split between auditory and visual, while linguistic at 71% dominated quantitative at 29%. Asians in the sample showed visual dominance 53% over auditory 47% and linguistic

dominance 60% over quantitative at 40%. Overall, auditory dominated visual 52% to 48% and linguistic dominated quantitative 74% to 26%.

Table 3.9 displays the results of a survey completed by all students in the sample who responded to the LSS videodisc. According to the survey results, 100% of the students said they understood all of the words used during the LSS program. In response to the question, "Did you understand all the questions?", 95% said yes and 5% said no. To question 3, "Were you offended or bothered by any of the questions?", 95% said no and 5% said yes. In response to question 4, "Did you lose interest at any point in the program?', 90% said yes and only 10% said no. The most common response to the follow-up question referred to the length of time needed to complete the LSS.

For item 5, "Did the story help you answer the questions?", 60% said yes, 10% said no, and there was no response from 30% of the sample. Only 20% of the subjects responded yes to the question, "Did you use the REPEAT (R) key?", while 55% responded no, and there was no response from 25% of the sample. The majority of those responding yes to item 6 identified 2 as the number of times they used the REPEAT key.

For item 7, "Did you understand the description of your learning style?". 70% said yes, 5% said no, and there was no response from 25% of the sample.

On the "comments" section of the survey, 80% responded that the videodisc version was easier to complete, while only 20% identified the paper-pencil version as being easier to complete. The total sample, 100%, thought that the videodisc version was more interesting. Of those who said they would recommend one of the two versions (called surveys) to their

Table 3.9

National Field-Trial Videodisc Survey Results

n = 240

Learning Style Survey--Your Comments

1.	Did you understand all the words used during the program?		Yes (100%)	No (0%)
2.	Did you understand all the questions?		Yes (95%)	No (5%)
3.	Were you offended or bothered by any of the questions?		Yes (5%)	No (95%)
4.	Did you lose interest at any point in the program?		Yes (10%)	No (90%)
5.	Did the story help you answer the questions?	NR = 30%	Yes (60%)	No (10%)
6.	Did you use the REPEAT (R) key?	NR = 25%	Yes (20%)	No (55%)
7.	Did you understand the description of your learning style?	NR = 25%	Yes (70%)	No (5%)

1.	Which of the two surveys did you think was easier to complete?	Videodisc (80%)	Paper-Pencil (20%)
2.	Which of the two surveys did you think was more interesting?	Videodisc (100%)	Paper-Pencil (0%)
3.	Would you recommend either of these surveys to your friends?	Videodisc (85%)	Paper-Pencil (15%)
	If you answered yes, which survey would you recommend?	Videodisc (85%) NR = 15%	Paper-Pencil (15%)

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friends, 100% identified the videodisc version as the one they would recommend.

Conclusions

The following conclusions are drawn from the data reported above:

1. The Learning Style Survey is stable over time based on the Pearson correlation of test-retest reliability of .78.
2. Based on the Cronback's ALPHA of .85, the LSS seems to be internally consistent.
3. The correlation of equivalence of .68 provides evidence that the LSS and CSII are equivalent forms.
4. The stability (.78) and the internal consistency (.87) of the LSS are slightly higher than those reported for the CSII, .75 and .85 respectively.
5. The LSS clearly measures two distinct factors identified as Auditory and Visual Learning Style.
6. Evidence of construct validity is provided based on the results of the factor analysis and the multitrait/multimethod matrix. That is, the LSS and the CSII seem to be measuring the same constructs.
7. Face and Content validity evidence are provided by the logical one to one match between LSS and CSII items.
8. Students in the sample who read at the elementary level seem to be more auditory than visual in learning style.
9. Students in the sample who read at the jr. high level seem to be more auditory than visual in learning style.

10. Students in the sample who read at the high school level seem to be more visual than auditory in learning style.
11. Whites in the sample are more dominant in AL and VL styles than in AQ and VQ styles.
12. Blacks in the sample are more dominant in the AL style than any other style.
13. Hispanics in the sample seem to be more dominant in AL style than any other style.
14. Asians in the sample seem to be more dominant in AL style than any other style.
15. There seems to be a relationship between reading level and dominant styles:

    Whites at elem. and jr. high levels are dominant in AL style.

    Whites at the high school level are dominant in the VL style.

    Blacks at the elem. and jr. high levels are dominant in the AL style.

    Blacks at the high school level show dominance in AL and VL styles.

    Hispanics at all reading levels are dominant in AL style.

    Asians at the elem. level are dominant in the AL style.

    Asians at the jr. high level have split dominance in Al, VL, & VQ styles.

    Asians at the high school level are dominant in the VL style.
16. Whites in the sample are more visual than auditory and more linguistic than quantitative.

17. Blacks in the sample are more auditory than visual and more linguistic than quantitative.

18. Hispanics in the sample are split evenly in auditory and visual styles and more linguistic than quantitative.

19. Asians in the sample are more visual than auditory and more linguistic than quantitative.

20. Reading level seems to influence auditory/visual but <u>not</u> linguistic/quantitative dominance.

    - At all reading levels among all races in the sample, students were more linguistic than quantitative.
    - Auditory/Visual dominance varied among all races in the sample by reading level. (Refer to Table 3.8)

21. Students in the sample preferred the LSS over the CSII.

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APPENDIX A

PROJECT OBJECTIVES

LEARNING STYLES SURVEY (LSS)

CENTRAL PIEDMONT COMMUNITY COLLEGE

INTERACTIVE VIDEO DISC PROJECT

I. PROJECT OBJECTIVES

The overall project goal can be broken down into one primary objective with secondary and supporting objectives.

Primary Objective

To produce a videodisc assessment instrument that will help semi-literate adults identify their preferred cognitive learning style so that they will be able to increase their reading levels more efficiently with less frustration.

Secondary

To develop tangible valid results that will justify further investigation, research and development in this direction.

Supporting

To provide opportunities for professional development of CPCC staff.

II. LEARNER OBJECTIVE

The project has one basic objective defined from the learners' point of view:

The Learners will be able to identify and apply their preferred cognitive learning styles as they work their way through the ABLE materials.

III. CRITICAL TASK FOR LEARNER

1. Motivate or orient learner with personal success story or testimonial with celebrity (Famous Amos).
2. Introduction to importance of concept and how they might use it.
3. Demonstrate the mechanics, logic and basic system procedures.
4. Practice basic entries.
5. Assessment scenarios.
6. Compile and interpret results.
7. Relate results to learner with how they might use them.
8 Provide prescriptive recommendations.
9. Follow-up counseling with staff.

IV. CRITICAL TASK FOR VOLUNTEER FACILITIES

1. Orient new learner
2. Boot System
3. Coach name entry
4. Follow-up debriefing-counseling with Learner

V. DISC SEQUENCE (30 - 40 minutes on system)

A. Sign - on

1. Boot disc and diskette (Staff)
2. Enter name (Student/Staff)

B. Introduction

1. Open and introduce testimonial
2. Testimonial - 3 or 4 key points
3. Explain assessment concept
4. Repeat introduction (optional)

C. System Functions/Mechanics

1. Explain and demonstrate procedures
2. Touch key exercises
3. Option to repeat

D. Assessment Scenario - 32 questions with scenarios

1. Practice one or two entries
2. Repeat practice option
3. Begin assessment sequence

E. Feedback

1. Compile and interpret results
2. Explain results to students
3. Option to repeat explanation

F. Follow-up Counseling

1. Volunteer meets with student, reviews recommendations, outlines individual learning strategy and plans follow-up activity for student.

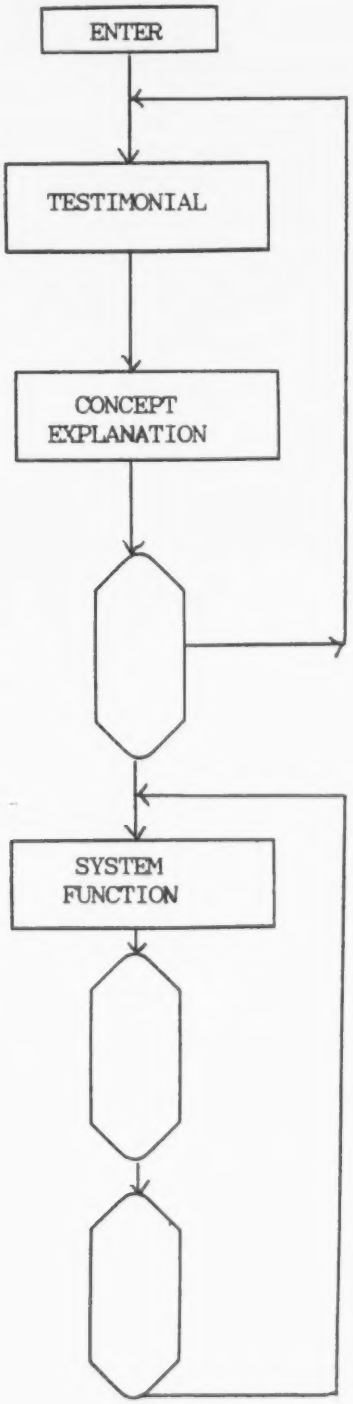
VI. CONCEPTUAL FLOWCHART

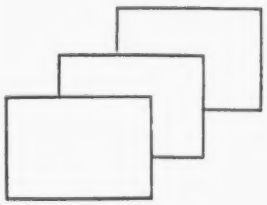
A. Sign-on

B. Introduction

C. Demonstrate System

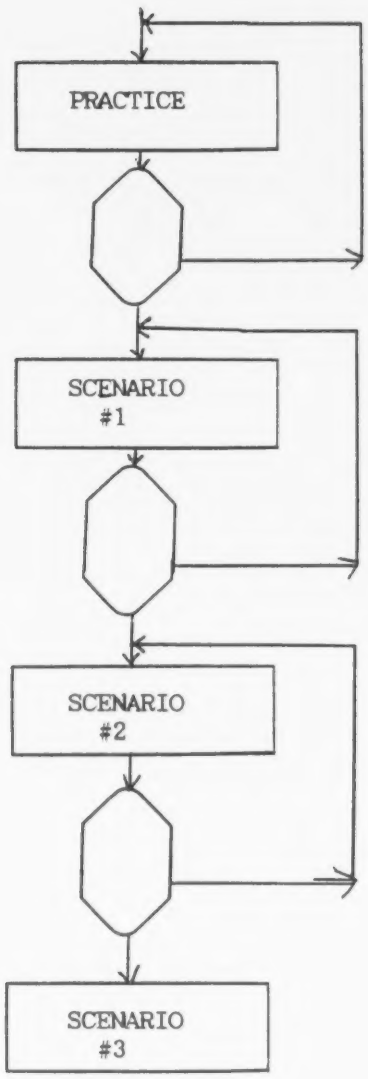
4 or 5 key entry exercises



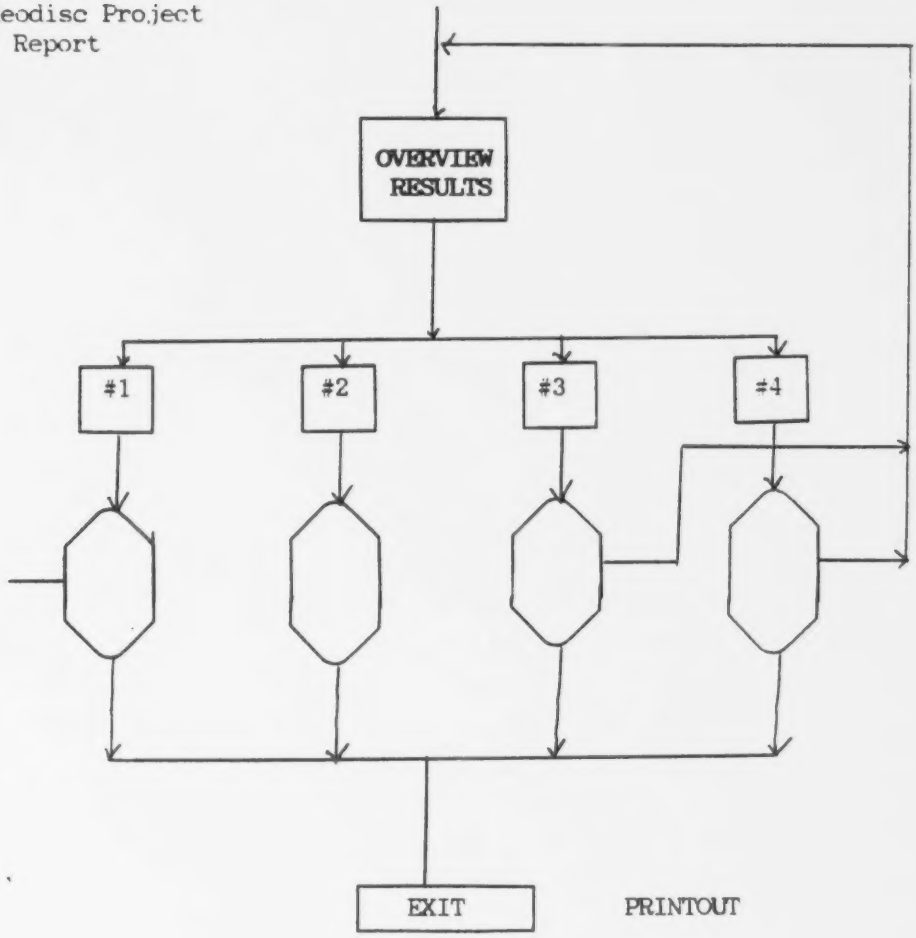


Possible Still Frame Sequences Throughout Sections

D. Assessment Sequence



E. Compile and interpret data



G. Follow-up Counseling
with Print-out

APPENDIX B

AUDIENCE ANALYSIS

LEARNING STYLES SURVEY

CPCC

INTERACTIVE VIDEODISC PROJECT

AUDIENCE ANALYSIS
COGNITIVE STYLES VIDEODISC
CENTRAL PIEDMONT COMMUNITY COLLEGE
(Compiled by Dick Handshaw & Associates)

GENERAL CHARACTERISTICS

Statistics

1. Average Age of Student - 34 years

Age Group	Percent of Students
20 - 29	30%
30 - 39	30%
40 - 49	20%
50 - 59	10%
60 - 69	6%
70 - 79	4%

2. Racial Breakdown of Students

Race	Percent of Students
Black	72%
White	27%
Other	1%

3. Percentage of female students: 48%
   Percentage of male students: 52%

4.

Sex by Race	Percent of Students
B Female	37%
B Male	36%
W Female	9%
W Male	15%
Other Female	2%
Other Male	1%

5. Breakdown of prior Education

Did not complete High School	70%
High School Graduate	23%
Adult HS Completion/GED	7%

6. Socioeconomic Breakdown
   a. Employment

Full Time	34%
Part Time	6%
Unemployed	60%

   b. Income Level
   No statistics on exact incomes, but majority of students employed earn less than $10,000.00 per year.

PERSONALITY CHARACTERISTICS

Half of the students are bright but have been discouraged or forced to quit school in the past. The other half of the students suffer learning disabilities which are varied and may cause any number of unexpected difficulties with learning materials, including this product.

Because of their past and present situations in life i.e., low income, unemployed status, bad experiences while in school, these students display the following characteristics:

1. A low self-esteem: These students have experienced let downs all their lives. They haven't finished school, many have lost jobs and have been rejected for new jobs.

2. A fear of failure: These students have come to expect failure in their lives. Coming to the ABLE Center was a big step for them and succeeding with the ABLE Program is very important. They are afraid to fail.

3. Embarrassment: In this society most people can read so these students are quite embarrassed that they can't. They go to lengths to cover this fact up.

4. Live somewhat sheltered lives: Just leaving the home is an effort when you can't read. You can't read street signs, signs in the grocery store or schedules. A lot of the ABLE learners choose not to leave the home to avoid the problems caused by the inability to read.

The Christian religion plays a dominant role in the lives of most of these learners. Many may have a strong religious background.

Because they are embarrassed about not knowing how to read and are afraid that they may fail at this new task, these learners want immediate results. They may be looking for a "quick fix".

MOTIVATION

Learners are motivated to complete the ABLE PROGRAM primarily for the following reasons:

1. They need the skills provided by ABLE to find a job.
2. They would like to obtain their G.E.D.
3. They enjoy the challenge of learning new skills such as:
   a. job acquiring skills (completing applications/resumes)
   b. using a computer
   c. reading
   d. writing
   e. arithmetic

ENTRY BEHAVIORS

Communication Skills

1. Proficiencies

   a. The students for the most part have good verbal communication skills.

   b. The students also have good survival and coping skills to achieve day-to-day tasks.

2. Deficiencies

   a. Reading Skills

      Broken down by grade level in Reading
      (Total percentages do not add up to 100% because math level also makes up part of the total)

Grade Level in Reading	Percent
0 - 4th grade	37%
5 - 8th grade	23%
High School Grad	1%

   b. Writing skills are also poor (spelling, grammar, sentence structure).

Learning Skills

1. Proficiencies

   a. Learners have little fear of the computer and adapt well to the keyboard.

   b. Learners, if they can go at their own pace, rarely become frustrated with the ABLE program's learning materials.

   c. Many of the ABLE learners are very bright but never had the chance to learn.

2. Deficiencies

   a. The learners have in the past had some difficulty with the Touch Screen.

   b. Many of the ABLE learners have learning disabilities. The most common learning disability is probably dyslexia.

LEARNER CONSIDERATIONS

We have seen that the learners in ABLE for the most part have a low self-esteem. Because of this they are very sensitive. The wording of the script will need to be encouraged and include more than the usual amounts of positive reinforcement.

Because these learners are good verbal communicators, the audio track script should be written at a normal adult comprehension level. This level will be considerably higher than the reading level for text graphics.

The ABLE students are afraid of failing so the design of the disc will need to be as fool-proof as possible. The answer analysis will have to be broad enough to accept a wide range of answers. Assuring success of individualized use of the disc without creating any confusion or lack of mastery on the part of the user is essential.

It might help to encourage students if they could see tangible results of their work. Upon completion of the Cognitive Styles Video Disc a personal diagnosis and prescription could be printed and given to the student so they see the fruits of their efforts.

The learners at the ABLE Center are easily embarrassed. Working individually is one way to avoid embarrassment. Another important aspect of the disc will be that it can be learner controlled. Designing the disc so that the students can page back or exit the disc at any time is essential to the success of this project.

Many of the learners lead sheltered lives so the scenarios in the disc must reflect topics that these students are familiar with.

Suggestions from the instructors at the CPCC ABLE Center for Topics include:

1. Job skills and job-seeking skills
2. Family
3. Church
4. Everyday occurrences that the learner can relate to i.e., driving, shopping, taking care of children.

Naturally, a narrator who is motivational will have to be selected for the Learning Style Survey. It would be ideal to find a person who has made a success of himself with the background of the typical ABLE student. Also a person who has experience in front of the camera would be a good candidate.

It has come to our attention through the CPCC ABLE Center that Wally Amos of "Famous Amos Cookie" fame would be good possibility for this Videodisc. Mr. Amos is a black man of modest background who built a Cookie Empire. He has experience in front of the Video Camera and is a big promoter of the ABLE Program. He has also been involved with the CPCC ABLE Program.

LEARNING ENVIRONMENT ANALYSIS

ABLE Centers are in neighborhoods where demand is the highest. Locations for ABLE Centers are selected not only based on the demand but are also selected to give the student anonymity.

Completing the Cognitive Styles Videodisc will be the second Activity to be done by new ABLE Learners. Before beginning their course of instruction, the learners spend an hour with a volunteer who explains the ABLE program to them.

The atmosphere at the Center is open and friendly, the equipment is technologically advanced. The students are at ease with the computer and the keyboard, but the ABLE Center has had some difficulty with use of the Touch Screen.

LEARNING ENVIRONMENT ANALYSIS

ENVIRONMENTAL CONSIDERATIONS

Because the student always encounters a volunteer first, the volunteer is in a good position to prepare the learner for the Videodisc. Volunteers should be given a job aid to assist them in proper orientation of the learner.

Students are in the ABLE Program because they are motivated to learn. For these students, learning how to use the keyboard makes them feel like they are mastering the computer. The Touch Screen may make them feel like they are avoiding the learning process. It would be most advantageous to have the keyboard interfaced with the videodisc as much as possible.

We also recommend testing the use of Touch Screens before implementing them due to past problems that the ABLE Center has faced using Touch Screens. These problems may be linked to design problems, or may be linked to deficiencies in the target audience.

SUMMARY OF LEARNER AND ENVIRONMENTAL CONSIDERATIONS

Keep language and style literal, simple and direct.

Capture the user name as a variable to be used throughout the disc.

Allow for acceptance of answers before audio portions are finished in order to avoid frustration or delays.

Allow the learner to practice the mechanics of the system before attempting the assessment portion.

Give learners the option to repeat the question segment before attempting answers.

Allow for single keystroke entry of answers avoiding the use of the enter key.

Do not allow the option to change an answer once it is recorded.

Provide for a bookmark function allowing learners to sign-off and return at any time.

Encourage learners to complete the assessment portion in one sitting.

Use the ENTER key to step through text and graphics screens - do not use the space bar.

Gear the audio track to an adult listening and comprehension level.

Use Voice Overs to explain procedures - don't confuse message by including narrator except in testimonial piece.

Use more than the usual amounts of positive reinforcement.

Incorporate possible HELP function with overlay window accessed through touch screen.

Use 40 column display with upper and lower case letters.

Art director will select and verify effectiveness of Background and Character Colors.

Most graphics should reside on the videodisc, as appropriate. This allows faster response time and better quality.

Graphics that might be subject to alteration may reside on diskette.

Suggest almost exclusive use of keyboard for learner response. Use of touch screen should be minimized and carefully verified.

Program length should not exceed 45 minutes.

Volunteers should have a job aid for orienting learners to the disc.

Volunteers will be required to perform sign-on, sign-off and entering demographic data.

Learners will be provided with a customized and personalized print-out of their cognitive style.

Caution should be exercised in the use of:

- Humor
- Analogies
- Religious references
- Idiomatic speech or colloquialisms

APPENDIX C

LEARNER TRYOUT IMPLEMENTATION PLAN

LEARNING STYLES SURVEY (LSS)

CENTRAL PIEDMONT COMMUNITY COLLEGE

INTERACTIVE VIDEODISC PROJECT

LEARNER TRYOUT
IMPLEMENTATION PLAN

For comparison purposes, we will be implementing four different surveys during this tryout. They will be labeled:

Survey #1 - The original 32 questions in their original order.
Survey #2 - The re-write of the original questions in the original order.
Survey #3 - The book with visuals and re-ordering of questions with written questions.
Survey #4 - The book with visuals and re-ordering of questions without written questions.

The tryout will be implemented in two meetings. During the first meeting half of the participants will complete Survey #3 and the other half will complete survey #4.

During the second meeting (at least the next day) each half of the participants will be divided in half again to complete Surveys #1 and #2.

AGENDA

DAY ONE

Introduction - 2:00 min.
Survey #3, #4 - 15-20 min.
Questionnaire #1 - 10-15 min.

DAY TWO

Survey #1, #2 - 10-15 min.
Questionnaire #2 - 5-10 min.

DO'S AND DON'TS OF A LEARNER TRYOUT

DO explain what's expected of the participant at the beginning of each session.

DO let the participant stop at any point in the process to ask questions or offer information.

DON'T explain anything that is not explained or clarified by the learning materials unless it prohibits you from completing the process.

DO record all questions and comments.

DO record the total time for completion.

DON'T allow the participant to dwell on one question or point for an inordinate length of time.

DON'T reinforce or discourage participant's responses.

INTRODUCTION
(Time: less than 2 min.)

First of all, we'd like to thank you for your help. We need your advice about this new survey that we're working on to see if it really works. You see, you're our expert, because the survey is being designed for you.

You might remember that when you were in school, nobody ever asked you if you liked the textbook you were using, or even if you liked learning from books. Well, here at the ABLE Center, we developed a questionnaire to find out more about your learning style. It's not important for you to know what your learning style is, all you have to do is answer some questions - that's what we call a survey.

Then we'll ask you some more questions about how you liked the survey. We'll use your expert advice to make the survey better for other people to use.

When you're taking the survey, we'll show you some pictures and explain what's going on in the pictures. We'll want you to tell us what you would do if you were in that person's place. We don't want you to try to guess what that person will do, we want to know what you would choose to do. And the best part is, there are no wrong answers. Whatever you would do is the right answer. You don't even have to worry about writing your answers down, someone else will do that for you.

Remember, what we want to find out is what you like or don't like about taking this survey, or anything that you didn't completely understand. We can't fix it if you don't tell us about it.

And one more thing. Because you agreed to help us by giving us your advice, we'll look at your results, and tell you what we think your favorite learning style is. So thanks again for your help, and have fun.

QUESTIONNAIRE #1

1. Is the reading level appropriate?

2. Is the vocabulary appropriate for the listening level?

3. Are the questions clear and easy to understand?

4. Are any of the questions likely to lead or bias the participant's response?

5. Are any of the questions intimidating, condescending or culturally offensive?

6. Does the disc hold the participant's interest?

7. Is there a point at which the participant's interest begins to fade? If so where?

8. Is the visual theme appropriate and relevant?

9. Does the story line confuse or mislead the participant?

10. In your opinion did the use of the story line add or detract from the participant's overall experience?

11. Did the participant attempt or request to change an answer?

12. Did any questions seem particularly difficult or confusing?

13. Are there any questions that took significantly longer to complete than any others?

QUESTIONNAIRE #2

1. Which of the surveys was easier for you to understand, the first one or the second one?

2. Which of the surveys was more interesting, the first one or the second one?

APPENDIX D

FIRST VIDEODISC SCRIPT

LEARNING STYLES SURVEY (LSS)

CENTRAL PIEDMONT COMMUNITY COLLEGE

INTERACTIVE VIDEODISC PROJECT

FIRST DRAFT

SCRIPT TREATMENT
FOR LEARNING STYLE SURVEY

July 10, 1986

Characters:

Wife - black woman in mid thirties.
Husband - black man in mid to late thirties.
Friend - black female in late twenties.
Teenager - black, teenaged female.
Child - black boy, aged 8-10.
Boyfriend - white male in early 20's
Girlfriend - white female in early 20's
Uncle - black man in late 40's or 50's

Begin with a brief explanation of the Day in the Life of concept.

FADE UP on CU of coffee cup, hand pours coffee into cup, ZOOM to MCU of cup with radio in BG. RACK FOCUS to radio which is playing music (or beginning of weather report?) FREEZE

1. Question #9
   Do you try to listen to the news on the radio?

   RAPID ZOOM TO MS of kitchen. Mother is looking in refrigerator and calling off grocery items as child or teenager is writing list. FREEZE

2. Question #28
   If you tell someone what things you need, do you read the list to be sure it's correct?

   Husband enters kitchen, kids leave for school, Husband and wife engage in conversation. He says he's going to his training class today. She asks what they're going to be studying. FREEZE

3. Question #6
   Do you understand things better when you talk about them?

   Husband leaves for work. WS of wife in kitchen, she grabs her purse to leave, makes gesture indicating she just remembered something important, scribbles a quick note. CUT TO CU as she puts note on refrigerator. We can see a first name at top of note. FREEZE

4. Question #5
   Are your written messages easy to understand?

DISSOLVE TO NEW SCENE

CAMERA TRUCKS next to wife as she walks down urban street. She meets a friend who asks if she' ready for her driver's test. She replies that she's ready, and asks her friend if she's ready for that big sale that she has been waiting for. HOLD 2S as two women continue to talk. FREEZE

5. Question #15
Do you discuss sale prices with others before you go shopping?

HOLD 2S as women continue to walk. Friend asks wife if she has seen this morning's paper. She exclaims that "all children's clothes are 20% off, and that I can get their school clothes for just..." FREEZE

6. Question #22
Do you like to solve math problems in your head?

CUT TO 2S of women. Friend says "here's our bus now." Both women turn to get on bus.

DISSOLVE TO NEW SCENE

WS of plant exterior, bus drives by. ZOOM IN AND CUT to interior of break room. Boyfriend sitting at table with husband. Boyfriend tells husband that his girlfriend is looking for a nice used car. As they talk, camera ZOOMS IN TO CU of the cover of Car Trader. FREEZE

8. Question #26
Do you like to learn about things by reading about them?

2S OF two men talking. Husband says that his uncle has a used car lot, asks boyfriend if he wants the phone number. Boyfriend says "sure". FREEZE

9. Question #17
Do you write a telephone number down in order to remember it?

Husband says that his uncle's car lot is down on Oak St. and asks boyfriend if knows how to get there. FREEZE

10. Question #12
When you go to a new place, do you ask for directions?

Husband looks at watch and says, "...it looks like we'd better get back to class." They get up to leave and as they get up to leave, camera ZOOMS IN TO CU of extra talking on pay phone in break room. FREEZE

11. Question #10
Do you talk to your friends on the phone?

CUT TO WS on pair walking into classroom, they take their seats. ZOOM OR CUT TO MS of teacher. Teacher asks if everyone has finished their assignments. FREEZE

12. Question #4
Do you solve math problems faster than other people?

WS of teacher in front of class. Behind him is blackboard with numbers on it. He poses a question to the class, and asks for a response from them. FREEZE

13. Question #2
Do you find it easy to talk about math problems?

Teacher poses another question to the class and asks for a response. CUT TO WS OF CLASS FROM POV of teacher. FREEZE

14. Question #32
Do you solve math problems faster when they are written?

Teacher says "that completes our homework assignment, let's team up with our lab partners and begin the next lab exercise." CUT TO 2S of husband and boyfriend as they begin working together. FREEZE

15. Question #20
Before you try new things, do you like to have people explain them to you?

DISSOLVE TO NEW SCENE

Wife and friend are getting off the bus in front of the mall. They separate and say good-bye to each other as they both walk out of the scene. Friend wishes wife good luck on her driver's test.

CUT TO TRUCK SHOT of line at license bureau. Some people are looking at booklet, some are talking. Camera reaches wife who is quietly standing in line. FREEZE

16. Question #7
When you are learning something new, would you choose to use books?

TRUCK TO 2S of wife and person standing behind her. Extra in line behind her says "...excuse me, can I ask you a question?" FREEZE

17. Question #18
Are you good at explaining things to others?

DISSOLVE TO NEW SCENE

Friend is sitting at lunch table or counter. Wife enters scene and sits down at table. Friend asks about driver's test, wife says that she passed, friend says "let's order..." Women continue talking while camera PANS RIGHT to next table or stool where man is reading a newspaper (USA Today). ZOOM TO MCU AND FREEZE

18. Question #19
Do you read the newspaper to find out the daily news?

PAN BACK TO 2S of wife and friend. Wife asks friend to tell her how much she saved at the sale. FREEZE

19. Question #24
When talking with a friend, do you like to use numbers to prove your point?

Lunch is finished, women grab their pocket books and begin to get up. Friend says "...we've got just enough time to get groceries..."

DISSOLVE TO NEW SCENE

Wife and friend are walking down cereal aisle in grocery store. Wife has basket over her arm with two or three items. ZOOM TO 2S AND FREEZE

20. Question #23
When you go shopping, do you read the prices and try to keep a running total in your head?

CUT TO MS of pair at check-out line. Clerk is calling off prices as she is ringing up the groceries. FREEZE

21. Question #25
Is it easy for you to add numbers in your head when you hear them?

CUT TO 2S of wife and clerk. Wife hands money to clerk. FREEZE

22. Question #8
Do you keep written records of how you spend you money?

DISSOLVE TO NEW SCENE

MS of boyfriend and girlfriend at car lot talking with uncle. Boyfriend says that husband was "...telling me about some of the good deals out here..." Uncle asks, "Did you have anything special in mind?" FREEZE

23. Question #29
Is it easy for you to remember numbers you have heard in a conversation?

CAMERA FOLLOWS as they walk over to car and lift the hood. ESTAB MS of all three. FREEZE

24. Question #13
If you were buying a car, would you ask to see the price sticker?

Girlfriend walks around to driver's side, uncle opens door as she gets in. CUT TO MCU of girlfriend as she turns to uncle to ask a question. FREEZE

25. Question #31
If you were buying a car, would you ask the salesman to explain the monthly payments?

CUT TO MS of all three as girlfriend gets out of car. Uncle asks them if they have any more questions. FREEZE

26. Question #14
Do you like people to explain what they mean?

DISSOLVE TO NEW SCENE

WS of kitchen interior, wife is putting groceries away. Husband walks in looking at bills. ZOOM TO CU of bills. FREEZE

27. Question #30
Do you keep correct records of the bills you pay?

CUT TO MS of child putting together a toy at the kitchen table. Child asks his father for help. Husband says "sure, what have you got there..." puts down bills and goes over to the table. ZOOM TO 2S AND FREEZE

28. Question #21
Do you read directions when you put something together?

CUT TO WS of kitchen, RADIO SOUND UP, DJ announces phone number to call for contest. Wife excitedly reaches for the telephone as CAMERA ZOOMS IN on phone. FREEZE

29. Question #16
Can you remember a telephone number once you have heard it?

DISSOLVE TO NEW SCENE

WS of living room interior, wife is writing a letter, husband is sitting down at a table. CUT TO OS of wife and ZOOM TO CU of letter as wife puts her pen down indicating she has finished her letter. FREEZE

30. Question #1
After you write a letter, do you read it out loud to hear how it sounds?

CUT TO CU of husband sitting at table. He opens his book. FREEZE

31. Question #27
Do you like to work out math problems on paper?

CUT TO WS of living room. Wife picks up magazine and goes to kitchen. CAMERA FOLLOWS wife into kitchen where wife opens magazine and puts it down on the counter. CUT TO CU of open magazine. FREEZE

32. Question #3
When you read stories, do you usually understand what you read?

RACK FOCUS to coffee cup in left foreground. Hand and coffee pot come in from right to pour coffee into cup. FADE BLACK

APPENDIX E

THE HILL COGNITIVE STYLE INTEREST INVENTORY

LEARNING STYLES SURVEY (LSS)

CENTRAL PIEDMONT COMMUNITY COLLEGE

INTERACTIVE VIDEODISC PROJECT

COGNITIVE STYLE INTEREST INVENTORY

BEST COPY AVAILABLE

Central Piedmont Community College Charlotte, North Carolina

INTRODUCTION
COGNITIVE STYLE INTEREST INVENTORY

This inventory was designed to determine how you perceive the world about you. Your perception has much to do with the way you acquire meaning throughout your life. Education in this context may be defined as a continuing process of searching for meaning. The search for each individual is unending and may be very different for each person.

Your responses to this inventory will produce a profile illustrating the ways that you prefer to learn. Relax and let this be an easy experience.

Read each item and decide if that situation is true for you *U*sually, *S*ometimes, or *R*arely. Do not puzzle over the items. Try to respond immediately and just as you feel.

The answer sheet for this inventory is computer scored; you must use a number 2 pencil to mark your responses. Begin by writing in your name and then gridding in the letters below it. Next, indicate your social security number under student number, and then curriculum or program, age, sex, profession and today's date.

Mark your responses for each item inside the appropriate circle. For example:

1. Ⓤ ● Ⓡ

2. ● Ⓢ Ⓡ

Begin when you are ready. There is no time limit, but you should be able to finish in 45-50 minutes.

COGNITIVE STYLE INTEREST INVENTORY

U = Usually
S = Sometimes
R = Rarely

1. After I write a letter, I read it aloud so that I know how it sounds.
2. When taking courses in mathematics, I find it easy to 'talk in formulas' with my classmates and teacher.
3. I score high on achievement tests which depend upon reading comprehension.
4. When I am in a group of people trying to solve a written mathematical problem, I am among the first to reach a correct solution.
5. My written explanations are easily understood.
6. I do best on a test if it covers information I have discussed
7. I prefer classes which rely heavily on textbooks for information.
8. I use a written record to account for money for which I am responsible.
9. I make it a point to listen to the news on the radio.
10. I communicate with friends and colleagues by telephone.
11. I refer to or read a map when I am going to a strange place.
12. I prefer verbal directions for finding a strange place.
13. If I were buying a car, I would ask the salesman to write out or show me the printed engine specifications.
14. I like people to talk to me about what they mean.
15. I discuss 'sale' prices with others before I go shopping.
16. I can remember a telephone number once I have heard it.
17. I write a telephone number down to remember it.
18. My friends like to listen to my explanations of difficult concepts.
19. I read the newspaper to find out the daily news.
20. I prefer to have verbal directions for new activities.
21. I read directions when I must assemble something or make something.
22. I like verbal (oral) tests in mathematics.
23. When I go shopping, I read the price of each item and keep a running total in my head.
24. I quote statistical data to others in order to prove my point in an argument.
25. I find it comfortable to add spoken or dictated numbers mentally.
26. I prefer to acquire information by reading about it.
27. I achieve best on written mathematics test.
28. After I dictate a letter, I read it to be certain it is correct.
29. It is easy for me to remember the numbers and formulas I have heard during a conversation.
30. I keep accurate written records in my check book.
31. If I were buying a car, I would discuss the engine specifications with the salesman or a friend.

32. I solve mathematical problems more rapidly if they are written.
33. I can remember music well enough to recognize a 'tune' the next time I hear it.
34. I can tell 'what's for dinner' by the smell when I enter the house.
35. I prefer to participate in the sports that I am 'naturally' good in.
36. I experience less pain when the dentist uses pleasant tasting materials in my mouth.
37. I can feel the difference between leather and metal.
38. It is easy for me to understand a story in a movie.
39. I can tell if something is wrong with an engine by listening to it run.
40. Any unpleasant smell is more disturbing to me than to others.
41. I ignore my feet when I am walking.
42. I can recognize who is on the phone just by listening to the voice for a few moments.
43. I prefer fabric that I enjoy running my fingers over.
44. I prefer to read articles which are illustrated by pictures or drawings.
45. I enjoy trying new foods in order to experience new tastes.
46. The tone or inflection of a speaker's voice gives additional meaning to his words.
47. I tune the radio by the way the station sounds.
48. I can write legibly as another person dictates to me.
49. The 'smell' is an important component of the pleasure connected with a new car.
50. My choice of a beverage is determined by its taste.
51. I can catch a ball that has been hit or thrown.
52. I return to a restaurant because of the taste of the food served there.
53. I can play ping pong well enough to enjoy it.
54. Random sounds interfere with my ability to concentrate.
55. I enjoy food if I like its taste.
56. I believe the customary smell of a store influences the volume of its sales.
57. I pick up and feel vegetables and fruits in the store before buying them.
58. When I tune a radio, I look at the dial.
59. I can recognize the difference between two closely pitched sounds.
60. Blindfolded, I can taste the difference between tea and coffee.
61. I decide that my hair needs washing by the way it feels when I touch it.
62. I have been told that I am a good dancer.
63. I enjoy looking at art work.
64. I am considered to be a 'good' amateur athlete.
65. I prefer to write with a pen that feels comfortable.
66. I can distinguish fresh fruit from stale fruit by the smell.
67. I use my fingers to supplement my eyes to determine the quality of the finish on wood.
68. I am able to identify which instruments are playing at various times during a concert.
69. When cooking, I use various spices until the food tastes 'right'.

70. I choose clothes for the way they look on me.
71. I can distinguish between several varieties of flowers by smelling their blooms.
72. I can distinguish a nickel from a dime when I reach inside my pocket.
73. I notice gas fumes in the car or in the house sooner than others do.
74. I taste wine to determine its quality.
75. I understand a lecturer better if I can look at him as he talks.
76. The aromas in a room determine for me whether it is a pleasant or an unpleasant place.
77. I think in pictures and graphic models.
78. I can button my coat in the dark.
79. When I type, I keep my eyes on the copy rather than on my fingers.
80. Seeing a picture of a person makes me feel better acquainted with him.
81. I laugh with the person who laughs when he stubs his toe.
82. Utility and efficiency are important but they should not be emphasized to the exclusion of beauty.
83. The quality of one's work does not deteriorate when the supervisor is away.
84. I can say and do things the way I feel that people expect me to.
85. I shrug my shoulders when saying, 'I don't know.'
86. I am able to offer criticism without offending another person.
87. I enjoy the sight of people dancing.
88. I would stop for a 'STOP' sign any time even if there were no other person in sight.
89. When someone is frightened, I can be patient and calm rather than reply in anger.
90. I blush in embarrassing situations.
91. I shout and pretend to be tough in order to frighten others when I am frightened myself.
92. I can accept parents being 'bossy'.
93. I greet a late arriving guest enthusiastically.
94. The values of our society are good for everyone.
95. I require beauty in my surroundings outside as well as inside buildings.
96. I can pretend to be 'learned' when the situation demands such behavior.
97. I direct my life according to moral values.
98. I can pretend to be attentive and interested even though bored when listening to a teacher or supervisor.
99. I would give up an immediate objective rather than sacrifice a principle.
100. My friends tell me that I am understanding.
101. I can pretend to be friendly and accepting in order to acquire favors.
102. I enjoy the author's writing style as much as the story he tells.
103. Eye movements are important supplements to my conversation.

104. I am the type of person who can relate to others and their needs.
105. I can successfully adjust my behavior (formal or informal) according to the situation.
106. I use facial expressions to communicate emotions.
107. I would give up monetary gain to avoid a compromise of principles.
108. I do not permit personal affairs to interfere with completing an assignment.
109. I 'talk with my hands' more than others do.
110. I enjoy listening to music.
111. Walking with a spring in your step gives the impression that you are happy.
112. I feel uncomfortable when I observe another person being punished.
113. I can give the impression that I am calm and comfortable even though I am angry and uncomfortable.
114. I would go out of my way for a scenic view.
115. Can you interpret a person's sincerity by his/her handshake?
116. I enjoy reading poetry.
117. I enjoy telling jokes and stories at a party.
118. Beauty should be considered as well as usefulness and efficiency.
119. I interpret a person's mood by the way he sits or stands.
120. I believe that a promise should be kept.
121. I have enjoyed acquiring good skills so that I can participate successfully in sports.
122. If I attempted to kiss someone, I would not be snubbed.
123. I set goals consistent with my own needs and abilities.
124. I can bring a group to some agreement.
125. I know when I am 'up-tight'.
126. I would drill on correct finger movements to become a good typist.
127. I accurately predict my prospects for success in most situations.
128. Sales people find the merchandise that I am asking for.
129. In the past I practiced handwriting skills so that I write legibly now.
130. One should seek advice from an expert when beginning a new sport.
131. I am self-confident in assuming a new responsibility.
132. I am willing to repeat the steps until I can do them perfectly when learning a new dance.
133. I am able to convince teachers that an alternative to an assignment is acceptable.
134. I have practiced to achieve good form in sports I have learned.
135. I wait for an invitation to be seated in making a call on a supervisor in his office.
136. I discuss 'personal' matters with those who listen to such things professionally or with friends and relatives.
137. Peers involve me in resolving problems.
138. I play the piano or other musical instruments the 'right' way.
139. I complete my assignments because 'I don't bite off more than I can chew'.

140. People who have good form are most successful in motor activities like typing, playing an instrument, or sports.
141. I accept criticism without feeling resentful.
142. I request permission before taking a seat near a stranger.
143. I can influence others to join me in a cause.
144. I would wait to be introduced to a famous celebrity rather than introduce myself.
145. I reserve the use of first name greeting to friends and associates.
146. I am able to convince myself to keep at a task which I set for myself.
147. I can convince others that my opinions are right.
148. I am able to predict my own performance in a situation which I had not experienced before.
149. I do not borrow money from strangers.
150. I give directions in such a way that others accept them.
151. I would wait to be addressed by a supervisor rather than take the initiative in greeting.
152. I am able to put people at ease in tense situations.
153. I make it a point not to let my work interfere with family plans.
154. I enjoy my activity more if my friends participate in it with me.
155. When given a job to do, I prefer to do it myself.
156. When shopping for clothes, I prefer having a friend along to help me make choices.
157. I make my own political choices.
158. I consult with my immediate family before making decisions.
159. After gathering data from many sources, I make decisions alone.
160. Family values have lasting effects on each of us.
161. I like to share ideas with friends and associates.
162. I enjoy outdoor activities when I am with my family.
163. One's religion is a purely personal decision.
164. Before taking a new job, I would discuss it with my friends.
165. I talk with my family before doing anything that might affect them.
166. I make personal decisions after discussing them with my friends.
167. When given a problem to solve, I determine the best solution by myself.
168. I prefer to study on my own.
169. I find it important to consult my family in planning vacations.
170. I am influenced by my friends' political opinions.
171. I understand events better after discussing them with my family.
172. I do not need others to help me make decisions.
173. I would join a religious group if my friends belonged to it.
174. I learn a subject more easily when I can discuss it with my associates.
175. Before voting in an election, I review the candidates with my family.

176. I would rather do things my way even if this does not conform to the expectations of my family or friends.

177. I can use jokes or humorous remarks to change the focus in many situations.

178. I find myself in the position of having to make a decision before I know enough about the situation.

179. I do not change my mind on a subject once I identify the rule which applies.

180. I work best in an organized or structured situation.

181. I like to see several examples before starting a new project.

182. I understand geometric theorems.

183. I understand a topic better if I analyze it to learn how it differs from other topics.

184. The more information you collect about a problem, the better your solution will be.

185. People should not break the law.

186. Characteristics for successful people are not the same as those for unsuccessful people.

187. Knowledge flows logically from given premises.

188. I would find it interesting to discover how people behave by evaluating things which make them tick (e.g., physiological, sociological, and psychological).

189. I choose music that contrasts with my mood in order to control my feelings.

190. Holidays are different from other days of the year.

191. Life is simple if you go by the rules.

192. The more I know about a problem, the more I want to know about it.

193. I like essay questions on examinations.

194. When shopping for clothes, I buy without further comparison if I find the article I had in mind.

195. Problem-solving involves related information.

196. I find it essential to 'play by the rules'.

197. I 'play the devil's advocate' with people to force them to look at another point of view.

198. I try to understand why people break rules.

199. I need to know rules and exceptions to rules and specific examples before I am comfortable making a decision.

200. I find it easier to win an argument when I state a premise and give a conclusion that must be true. (This is a circle so the formula for the area is .)

201. In evaluating the performances of others, I find it helpful to determine how this performance differed from a previous performance.

202. I believe an explanation should describe the relationship of the facts to what I already know.

203. I find the type of reasoning demanded by the rules of mathematics suits my way of thinking.

204. I prefer working in situations where standards and rules are well explained.

205. In evaluating the performances of others, I refer to the standards which were set for them.

206. I enjoy the reasoning patterns required in statistics.

207. I take longer than others in coming to a conclusion because I want to know more about an issue than most other people do.

208. I enjoy games or puzzles in which the solution is deduced from information contained in the rules.

209. In my choice of clothing, I like to wear contrasting colors.

210. When looking at something constructed by someone else (a painting, a building, furniture) I like to figure out why the person created it as he did.

211. Information should be analyzed in a number of ways before a conclusion is reached.

212. I avoid probability statements in solving problems.

213. One cannot appreciate a problem unless he knows as much about it as possible.

214. I have no difficulty understanding how to put puzzles together.

215. When I attack a problem, I approach it from as many aspects as possible.

216. I find reasoning like this statement helps me to clarify my thoughts: 'All men are mortal; Socrates is a man; Therefore, Socrates is mortal.'

217. I recognize the appropriate time to end a telephone conversation.

218. My friends can depend upon me to do something on the agreed upon time.

219. I know when to offer my opinion during a group discussion.

220. I can judge which hostess will appreciate guests who arrive late.

221. I hand in my homework on time.

222. I can select the time when a group will welcome my joining them.

223. I finish tests in the allotted time.

224. I meet upon agreed deadlines.

Test items are reprinted with permission from Dr. Joseph Hill, V. Svagr, C. Walker, Oakland Community College, Bloomfield Hills, Michigan

APPENDIX F

ASPECTS OF COGNITIVE STYLE
(FROM THE HILL COGNITIVE STYLE INTEREST INVENTORY)

LEARNING STYLES SURVEY (LSS)

CENTRAL PIEDMONT COMMUNITY COLLEGE

INTERACTIVE VIDEODISC PROJECT

CENTRAL PIEDMONT COMMUNITY COLLEGE

COGNITIVE STYLE MAP PROFILE

THEORETICAL SYMBOLS

T(AL)	AUDITORY LINGUISTIC	MEANING FROM WORDS HEARD
T(AQ)	AUDITORY QUANTITATIVE	MEANING FROM NUMBERS HEARD
T(VL)	VISUAL LINGUISTIC	MEANING FROM WORDS SEEN
T(VQ)	VISUAL QUANTITATIVE	MEANING FROM NUMBERS SEEN

QUALITATIVE SYMBOLS

Q(A)	AUDITORY	MEANING THROUGH SOUND
Q(O)	OLFACTORY	MEANING THROUGH SMELL
Q(S)	SAVORY	MEANING THROUGH TASTE
Q(T)	TACTILE	MEANING THROUGH TOUCH
Q(V)	VISUAL	MEANING THROUGH SIGHT
(P)	PROPRIOCEPTIVE	COMBINING ASSOCIATED SKILLS
Q(CEM)	EMPATHY	FEELING FOR OTHERS
Q(CES)	ESTHETIC	ENJOYMENT OF BEAUTY
Q(CET)	ETHIC	COMMITMENT TO SET OF VALUES
(CH)	HISTRIONIC	PLAYING A ROLE
Q(CK)	KINESICS	UNDERSTANDING BODY LANGUAGE
Q(CKH)	KINESTHETIC	PERFORMING MOTOR SKILLS
Q(CP)	PROXEMICS	JUDGING ACCEPTABLE SOCIAL DISTANCE
Q(CS)	SYNNOETICS	PERSONAL KNOWLEDGE OF ONESELF
Q(CT)	TRANSACTIONAL	POSITIVE COMMUNICATION INTERACTION
Q(CTM)	TEMPORAL	BEHAVING ACCORDING TO TIME EXPECTATIONS

CULTURAL DETERMINANTS

A	ASSOCIATES	INFLUENCED BY FRIENDS AND PEERS
F	FAMILY	INFLUENCED BY FAMILY
I	INDIVIDUAL	SIGNIFICANT INDEPENDENCE

MODALITIES OF INFERENCE

M	MAGNITUDE	REASONING WITH RULE AND DEFINITIONS
D	DIFFERENCE	REASONING WITH CONTRASTS
R	RELATIONSHIP	REASONING WITH LIKENESSES
L	APPRAISAL	REASONING WITH MDR AND ANALYZING
K	DEDUCTIVE	REASONING WITH LOGICAL PROOF

APPENDIX G

LEARNING STYLES SURVEY (LSS)

FINAL VIDEO SCRIPT FOR THE

NATIONAL FIELD-TRIALS

CENTRAL PIEDMONT COMMUNITY COLLEGE

INTERACTIVE VIDEODISC PROJECT

LEARNING STYLE SURVEY

VIDEO SCRIPT

VIDEO	FACTOR	AUDIO
	(AL)	1. Do you try to listen to the radio?
		VALERIE, DICTATING: OK, we need peas, rice, and don't paper towels. . .
	(VL)	2. If you ask someone to write something down, do you read it to make sure it's right?
		BRENDA: Hey, Dad. WIll you help me with a model I'm building for biology class tonight?
		VALERIE: Do you have your class today?
		RAY: Yeah. We're going over last week's assignment. I sure hope I did it right. . .
	(AL)	3. Do you understand things better after you talk about them?
		RAY, LOOKING AT WATCH: If I don't watch it I'm going to be late myself. Bye, baby. See you tonight.
		VALERIE: I've got to go too. I told Estelle I'd meet her in a few minutes. Bye.
	(VL)	4. Are your written messages easy to understand?
		VALERIE: Good morning. How are you doing?
		ESTELLE: Hey! I'm fine. How are you? Ready for that big sale?
		VALERIE: Yeh, everything is 25% off!
	(AQ)	5. Do you talk about price with others before you buy something?
		ESTELLE: 25% off. I should be able to save almost five dollars on that clock radio for James' birthday.

(AQ) 6. When someone talks to you about number, is it easy for you to understand what they mean?

VALERIE: Hey, Estelle, do you know which bus we're going to take to Freedom Mall?

(VL) 7. Do you use a map when you go new places?

ESTELLE: This is it, Valerie.

JERRY: . . .the only problem is Carolyn had a lot of trouble with that last car.

RAY: I know what you mean. Say! I have some reports rating different cars for the past several years.

(VL) 8. Do you like to learn new things by reading about them?

JERRY: If you don't mind

RAY: I'll tell you something else you might do. . .A friend of my uncle sells cars. You could give him a call and tell him you're a friend of mine. He might be able to help. You want his number?

(VQ) 9. Do you write a telephone number down to remember it?

JERRY: I might try to be there after I pick up Carolyn from work.

RAY: Here's his address. Go by the lot--it's on Oak St.

(AL) 10. When you go to a new place, do you ask for directions?

JERRY: Hey, we better get back to class.

RAY: You're right. Let's go.

(AL) 11. Do you talk to your friends on the phone?

TEACHER: OK. While you were out I wrote this problem on the board. Now see if you can figure it out, and I'll go over your results with you.

(VQ) 12. Do you solve written math problems faster than other people?

TEACHER: OK, Ray do you have it?

RAY: I think so. Here's how I did it.

(AQ) 14. Do you solve math problems faster when they are written?

TEACHER: If you have any questions about the assignment, you might want to read chapter six.

(VL) 15. When you are learning something new, would you choose to use books?

JERRY: Hey, Ray. Would you mind explaining how you came up with the answer for that problem?

(AL) 16. Are you good at explaining things to others?

JERRY: Oh, I get it. Thanks.

RAY: Hey, no problem, I'm sure I'm going to need your help on the next chapter.

(AL) 17. Before you try new things do you like to have people explain them to you?

JERRY: Right! Say, you want to get some lunch?

VALERIE: I should get a salad, but I want a burger and fries.

ESTELLE: I know what you mean. I'm really hungry.

(VL) 18. Do you read the newspaper to find out the daily news?

ESTELLE: That sale was great! I bet I saved more than 25%.

VALERIE: Girl, you've got sale prices on the brain.

ESTELLE: Look, I saved five dollars on that clock radio, I bought six pairs of socks, and. . .

(AQ) 19. When talking with a friend, do you like to use numbers to prove your point?

VALERIE: That was a pretty good lunch.

ESTELLE: I'm full. So, you ready to go?

VALERIE: I've got to pick up a few things. Let me check my list.

ESTELLE: Wallace's is right next door. Why don't we go there?

(VQ) 20. When you got to the store, do you read the prices and try to keep a running total in your head?

CLERK: (reciting items from list in 2nd scene)

(AQ) 21. Is it easy for you to add numbers when you hear them?

CLERK: That will be four seventy-two out of five.

(VQ) 22. Do you keep written records of how you spend your money?

SALESMAN: So Ray sent you over to look at some cars.

JERRY: He said you were the man to see.

SALESMAN: Alright. Let me show you what we've got today. We just brought this model in this morning. It's only go 20,000 miles. This one over here has 35,000 miles.

(AQ) 23. Is it easy for you to remember numbers you have heard in a conversation?

CAROLYN: What kind of financing do you have?

SALESMAN: We have several options you might want to look at. I have a chart that shows the monthly payments back in my office.

(AQ) 24. If you were buying a car, would it help you to see the monthly payments written down?

SALESMAN: These charts show you how much your payments would be.

(VQ) 25. Would ask the salesman to explain the monthly payments?

CAROLYN: I understand the 36 month payment schedule. But what happens if I want to pay it off faster?

SALESMAN: Of you could pay this loan off with no pre-payment penalty.

(AL) 26. Do you like people to explain what they mean?

DJ: If you can be the first to name the artist and tell me the year that song hit the top of the charts, I'll send you a gift certificate for two for dinner at Maretti's. The number is 555-2429.

VALERIE, EXCITEDLY: Ray, wasn't that the song they were playing so much the year we graduated? It's the Four Tops. . .

(AQ) 27. Can you remember a telephone number once you've heard it?

BRENDA: Mama, have you finished that note to Mr. FLOYD yet? I've got to take it to school tomorrow.

VALERIE: I've just finished it.

(AL) 28. After you write a letter, do you read it out loud to hear how it sounds?

RAY, WITH BILL IN HAND: Hey, this one ways it's past due. I thought we paid it last month.

VALERIE: Let me see what you've got. . .

(VQ) 29. Do you keep correct records of your bills?

RAY: I've got to stretch. See if you can figures this out.

BRENDA: Dad, can you help me with my model now?

RAY: Sure. What's the problem.

(VL) 30. Do you read the directions when you put something together?

VALERIE: Look, Brenda. Tonight your Dad's got to finish the bills.

BRENDA: Hey, I've already done my homework.

RAY: Good for you. I've just to figure out a few problems myself.

(VQ) 31. Do you prefer to work out math problems on paper?

VALERIE: How about a cup of coffee?

RAY: Great.

(VL) 32. When you read something, do you understand what it means?

APPENDIX H

NATIONAL FIELD-TRIALS DATA COLLECTION FORMS

NAME _____

Groups A & B
Maricopa
Part 1

DATE _____

LEARNING STYLE SURVEY -- YOUR COMMENTS

INSTRUCTIONS: Please answer these questions by circling YES or NO.

1. Did you understand all the words used during the program? YES NO

2. Did you understand all the questions? YES NO

3. Were you offended or bothered by any of the questions? YES NO

4. Did you lose interest at any point in the program? YES NO

   If you answered YES, when did you lose interest?

   _____

5. Did the story help you answer the questions? YES NO

6. Did you use the REPEAT (R) key? YES NO

   If you answered YES, how many times did you use the REPEAT (R) key? _____

7. Did you understand the description of your learning style? YES NO

NAME _____

Groups A & B
Maricopa
Part 2

DATE _____

LEARNING STYLE SURVEY -- YOUR COMMENTS

INSTRUCTIONS: Please answer these questions by circling your answer.

1. Which of the two surveys did you think was easier to complete?

VIDEODISC

PAPER/PENCIL

2.

APPENDIX I

LSS FIELD-TRIAL LIST

LEARNING STYLE SURVEY FIELD-TEST LIST

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Appendix B

The Learning Style Survey Brochure

THE QUESTION IS:

WHAT WOULD IT TAKE FOR YOUR STUDENTS TO BE ABLE TO LEARN MORE AND RETAIN THAT KNOWLEDGE LONGER?

THE ANSWER

TWENTY-FIVE MINUTES WITH THE LEARNING STYLE SURVEY

Twenty-five minutes is all it takes to complete the Learning Style Survey. This interactive videodisc program was designed in conjunction with Central Piedmont Community College's Adult Basic Literacy Education (ABLE) program. It tells your students important information about how they can learn more efficiently.

BEST COPY AVAILABLE

ABOUT THE TECHNOLOGY

Interactive videodisc technology is a combination of two powerful educational media: television and microcomputers.

The most advanced and versatile application of instructional television is being delivered on videodisc. Videodiscs are developed by producing high quality video and editing the program using special techinques. The final videotape is then transferred to a videodisc master and copies are produced from that master. Videodisc players use laser technology to "read" the video information from the disc and translate it on to the television screen. This produces an extremely sharp picture that will not degrade over time. A videodisc will present a high-quality picture for thousands of viewings.

A microcomputer makes videodisc technology interactive. The microcomputer is connected to the videodisc player and communicates information telling the player what to do next. In the most powerful interactive videodisc applications, the microcomputer processes the input from the user and then tells the player what segment of the videodisc to branch to. Any of 54,000 frames of video can be accessed instantly. This "random access" capability is transparent to the user, who sees a program that is suited to his or her individual needs. Each user of an interactive videodisc could see a different program.

This technology is still developing and new applications are being announed every month. The opportunity for applying the capabilities of interactive videodisc to the needs of low-literate adults is exciting. Central Piedmont Community College, already a leader in using advanced technologies to improve literacy in Charlotte, North Carolina, is committed to exploring the unique possibilities available through the use of interactive videodisc. The Learning Style Survey is our first project in this emerging field.

THE LEARNING STYLE SURVEY

The Learning Style Survey is an assessment instrument designed to discover the preferred learning style of the user. This interactive videodisc is being used as part of the orientation program to the Adult Basic Literacy Education (ABLE) program in Charlotte, North Carolina. It introduces the concept of individual learning styles and describes the importance of understanding one's own style. The assessment instrument consists of thirty-two questions which are embedded in short video sequences. After completing the questions the user gets immediate feedback in terms of his or her preference for visual or auditory type learning materials and specific information on ways to learn most effectively.

The Learning Style Survey is based on the Cognitive Style Interest Inventory, a widely-used assessment instrument. Since this original instrument is paper-and-pencil based, the individual items can be very difficult for

a low-literate adult to comprehend. This greatly limits its usefulness with adults enrolled in literacy programs. In order to convert the original assessment items into an effective interactive videodisc format, the project team carefully revised the individual items and created a storyboard to help the students visualize each question. The storyboard was thoroughly tested and revised until student answers to the new items showed a high correlation with their answers to the original items. The video production developed from the storyboard, using high-quality computer graphics and digital effects to create a very polished look for the final product. Once the videodisc was mastered and all programming was completed, more testing and revisions took place. The final phase of evaluation included more than one thousand adult students from all over the country.

THE PROGRAM

Using the latest in advanced interactive video technology, the Learning Style Survey overcomes the limitations of paper-and-pencil tests by presenting the questions in video form. The average user needs only 25 minutes to complete the survey.

Part One

The program begins with a short, highly motivational introduction to the concept of individual learning styles presented by Wally Amos, founder of Famous Amos Cookies. Famous Amos, who serves as spokesperson for a national literacy volunteer organization, also describes how the user can learn more efficiently by understanding his or her own style.

Part Two

Part Two introduces the user to the Morrison family and their friends. These people appear throughout the program as the user follows them through a typical day in their lives. This section of the Learning Style Survey also gives the user the opportunity to practice interacting with the technology. The program can be used successfully by people who have never seen a computer before.

Part Three

Part Three presents the thirty-two questions which make up the survey. Each question is preceded by a short video sequence depicting typical situations from everyday life. The technology allows the user to repeat each sequence before answering the question.

Part Four

When the user finishes the assessment, the microcomputer immediately tabulates the results and branches the videodisc to show the user appropriate feedback on his or her preferred learning style. This information prescribes important ways the user can apply individual learning style techniques in order to learn more efficiently.

THE BENEFITS

The Learning Style Survey represents an exciting breakthrough in understanding how to teach low-literate adults more effectively. Following are some of the important benefits this program can provide your students.

- Introduces the concept of individual learning styles in clear, concise language
- Provides motivation for using computers by encouraging experimentation and giving lots of positive reinforcement
- Describes the user's learning style preference in terms of behaviors that will lead to more efficient and successful learning
- All feedback is positive — encouraging optimism and perseverence
- Effective with adults, adolescents and ESL students.

HARDWARE OPTIONS

The Learning Style Survey is available in versions that run on two of the most popular interactive videodisc hardware systems:

IBM InfoWindow
SONY View System

The IBM InfoWindow version utilizes the touch screen for user input and the SONY View System version uses the keyboard.

FOR MORE INFORMATION

For more information about the Learning Style Survey interactive videodisc program, contact:

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ABLE
ADULT BASIC LITERACY EDUCATION

cpcc
CENTRAL PIEDMONT COMMUNITY COLLEGE

Appendix C

"Using Videodisc To Assess Preferred Learning Styles"
Tim Songer and Steve Floyd
Proceedings: Fifth Annual Conference on Interactive
InstructionDelivery, Society for Applied Learning Technology

USING VIDEODISC TO ASSESS PREFERRED LEARNING STYLES

Steve Floyd
Floyd Consulting and Design

Tim Songer
Central Piedmont Community College

ABSTRACT

The Learning Style Survey is an assessment instrument designed to discover the preferred learning style of the user. This interactive videodisc was designed for use as part of the orientation program to the Adult Basic Literacy Education (ABLE) program in Charlotte, North Carolina. It introduces the concept of individual learning styles and describes the importance of understanding one's own style. The assessment instrument consists of thirty-two questions that are imbedded in short video sequences. After completing the questions, the user gets immediate feedback in terms of his or her preference for visual or auditory type learning materials and specific information on ways to learn most effectively.

In 1983, Central Piedmont Community College in Charlotte, North Carolina opened the ABLE Center. This innovative adult literacy program offers its students a combination of computer-based-training and volunteer tutors. In 1985, the college was awarded a U.S. Department of Education grant to produce reading courseware for adults functioning between the fourth and eighth grade level. In the first year of the grant, an interactive videodisc was produced to assess the learning styles of students at the ABLE Program. This program is designed to discover whether the student has a preference for visual or auditory learning materials. The Learning Style Survey is providing both the students and instructors at the ABLE Program with valuable information that was not available through standard paper and pencil instruments.

The Learning Style Survey is based on the Cognitive Style Interest Inventory, a widely used instrument among community colleges. Since this original instrument was a paper-based test, the project team was faced with the challenge of converting it to a valid videodisc-based format. In the early stages of development, an exhaustive audience analysis was completed to provide the design team with information on demographics, entry behaviors and a wide variety of learner considerations. Members of the project team then analyzed the questions from the Cognitive Style Interest Inventory in terms of the reading level and produced a set of questions that could be easily understood by an individual reading at the fourth grade level. These 32 questions were the basis of the treatment plan.

When the initial treatment of the assessment instrument was finalized, a paper based storyboard was produced. The storyboard began as a single "frame" for each of the thirty-two questions. The picture in each frame was designed to help the student visualize the question it helped represent. From these initial frames, the project team developed a series of short, sequential scenarios that led to each question. At that time a complete storyboard was produced of all the scenarios using a series of 4X5 black and white photographs.

An instructor from the ABLE Program was trained on how to use the storyboard (a 3-inch, 3-ring binder containing over 40 pages of photographs and questions) and began a fifty student tryout of the design. This tryout provided essential information about the face validity of the questions and the approach. The correlation between the paper-based Cognitive Style Interest Inventory and the new storyboarded questions was calculated after a significant percentage of students were tested. Initial correlations were low (.34).

The project team continued to monitor student responses to the questions and made revisions according to that feedback. After three levels of revision, the new questions with the revised scenarios correlated to the Cognitive Style Interest Inventory at .84, showing that the videodisc script and the questions in the script were not significantly different from the original instrument. Once this satisfactory level of correlation was achieved, the video production process began.

The highlight of the final production is the inclusion of Wally "Famous" Amos. Mr. Amos, who is the spokesperson for a national literacy volunteers association, shares a similar socio-economic background with many of the adults who are learning to read for the first time at Central Piedmont Community College's ABLE Center. His message of encouragement and perseverance adds much value to the videodisc.

Following is a brief description of what a student who uses the Learning Style Survey will experience:

1. The program begins with a short introduction from Famous Amos on the concept of learning styles. He explains why understanding this information about oneself can lead to a more successful and rewarding learning experience.

2. The student is introduced to the main characters of the program and given information about how to complete the survey. This introductory information is presented as a series of exercises designed to allow the user to get comfortable with the hardware and this application.

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3. After completing a practice question, the student begins the survey. Thirty-two questions are embedded in short (15-25 seconds) scenarios as the program follows six people through a typical day. The user has the option to repeat the question as often as needed before answering.

4. After answering all the questions, the user is presented with information that describes his or her preferred learning style. This feedback section is designed to give low-literate adults specific information about how to learn new reading or math skills most efficiently.

SUMMARY

The framework for the interactive design was based upon a thorough analysis of the participants' needs and the environmental factors that might influence their performance. As a result, the project team developed a comprehensive summary list of user and environmental factors that guided the important development decisions. The most useful information from that list includes:

*Keep language and style literal, simple and direct.

*Capture the user's name as a variable to be used throughout the program.

*Allow for acceptance of answers before audio portions are finished in order to avoid frustrations and delays.

*Allow the user to practice the mechanics of the system before attempting the assessment portion.

*Give the users the option to repeat the question segment before attempting answers.

*Allow for single keystroke entry of answers avoiding the use of the enter key.

*Do not allow the option of changing an answer once it is recorded.

*Encourage the users to complete the assessment portion in one sitting.

*Gear the audio track to an adult listening and comprehension level.

*Use Voice Overs to explain procedures -- don't confuse message by including the narrator except in the testimonial piece.

*Use more than usual amounts of positive reinforcement.

*Art director will select and verify effectiveness of background and character colors.

*Most graphics should reside on the videodisc, as appropriate. This allows faster response time and better quality.

*Design almost exclusive use of keyboard for learner response. Use of touch screen should be minimized and carefully verified.

*Program length should not exceed 45 minutes.

*Caution should be exercised in the use of:

Humor
Analogies
Religious references
Idiomatic speech or colloquialisms

A national field-test will be completed during the first half of 1987. The project team plans to show that the Learning Style Survey is as valid and reliable as the instrument it was based on; the Cognitive Style Interest Inventory. Studies will also show that the interactive videodisc version is much more useful for the low-literate adult population than its paper-and-pencil counterpart. Once validation is verified, plans for revising parts of the program to make the Learning Style Survey useful for all adult and adolescent populations will be completed along with additional recommendations and guidelines for curriculum development.

ABOUT THE AUTHORS

Timothy J. Songer is an Instructional Designer with a Master's Degree in Instructional Design and Educational Media from the University of North Carolina at Chapel Hill. Since 1982, Mr. Songer has written and produced over thirty training and marketing videotapes for First Union Corporation, Charlotte, North Carolina. In 1986, he headed up a team of instructional designers, adult literacy specialists and video professionals in the production of The Learning Styles Survey, an interactive videodisc produced at Central Piedmont Community College, Charlotte, North Carolina. This program is an assessment instrument designed to discover the individual learning styles of low literate adults. It was produced with funds provided by the U. S. Department of Education and is currently being field-tested at literacy centers in ten cities around the country.

Steve Floyd is a nationally recognized leader in the development of corporate video programming and interactive design. Before starting Floyd Consulting and Design, he was with the Coca-Cola Company as manager of Bottler Training and Video Development. Steve's video programs have received numerous awards from both ITVA and the U. S. Industrial Film Festival. As one of the nation's foremost authorities interactive design, Steve is a popular speaker and makes regular presentations to a wide range of groups including ITVA, ASTD, SALT, the North American Television Institute, and the High Technology Conference, among others. Steve was the editor of The Handbook of Interactive Video and he has written a monthly column for the Journal of Interactive Television. His client list includes Adolph Coors, A. L. Williams Insurance, Coca-Cola, General Motors, Georgia-Pacific, Great West Life Insurance, IBM, and the U. S. Government. Steve holds an M. S. in Instructional Systems Design and a B. A. in economics and English, both from Indiana University.

Appendix D

"Validation of the Learning Style Survey:
An Interactive Videodisc Instrument"
Dr. John Gretes and Tim Songer
Educational and Psychological Measurement,
Spring, 1989; Volume 49

Excised due to copyright restrictions

Appendix E

The READY Course
A Reading Comprehension Program with Digitized Audio

The READY Course

A Reading Comprehension Program with Digitized Audio

Project READY
Central Piedmont Community College
P.O. Box 35009
Charlotte, North Carolina 28235
(704) 342-6935

SYSTEM REQUIREMENTS

In order to run the READY Course Demonstration Disk, your system must include:

Hardware

* IBM PC, XT, AT, PS/2 Model 30 or above (including compatibles)
* EGA or VGA color monitor
* EGA or VGA graphic capabilities (Note that early versions of the PS/2 Model 30 contained an MCGA graphics card. The READY Course will not run with an MCGA graphics card.)
* Mouse and mouse driver

Software

* The READY Course Demonstration Disk

USING THE READY COURSE DEMONSTRATION DISK

1. Insert the READY Course Demonstration Disk in the A drive

2. Type: **Student Demo1** for individual viewing or
   Student Show1 for a group presentation

3. Follow the screen directions to proceed through the demonstration.

4. If you have any trouble booting this disk from the A drive, copy it into a subdirectory of your hard drive and repeat step 2.

A NOTE ABOUT AUDIO CAPABILITITES

The READY Course uses digitized audio at several points throughout the course. The audio has been extremely popular with students and has proven to be a very effective instructional tool. However, since most systems do not yet have audio capabilities, the course has been designed to work well without audio. The Demonstration Disk does not contain any audio files. Audio is available on the READY Course CD-ROM disc and through digitized audio boards designed for IBM and compatible computers. For more information about how you can access the digitized audio capabilities of the READY Course, call Tim Songer at (704) 342-6935.

THE READY COURSE: A READING COMPREHENSION PROGRAM WITH DIGITIZED AUDIO

Tim Songer and Chuck Barger
Central Piedmont Community College
Charlotte, North Carolina

Introduction

In 1985, Central Piedmont Community College (CPCC) began a three year grant from FIPSE to develop and evaluate reading courseware for adults functioning between the fourth and eighth grade level. Two products have been completed during the grant period: The Learning Style Survey and the READY Course. The Learning Style Survey is an interactive videodisc designed to assess the preferred learning styles of low-literate adults. This program has been validated during a national field test conducted in 1987 and is currently being used at literacy centers throughout the U.S. and Canada. CPCC is currently finalizing an agreement with a commercial distribution company to market the program for use on IBM InfoWindow, Sony View System, and Apple's Macintosh combined with a Pioneer 4200 player.

The READY Course was developed after initial results from the national validation of the Learning Style Survey showed a strong preference among a majority of adults reading below the eighth grade level for auditory based instruction. The READY Course was originally designed by Dr. Tom Duffy for CPCC. The course has been produced at CPCC using the TenCore Authoring language for delivery on IBM and compatible computers. Working from Duffy's original design and making modifications when necessary to accommodate software restrictions or to better meet the instructional needs of the students, a software "template" was created by Chuck Barger. This template is being used at CPCC to develop several new modules of the READY Course. Each module provides around five hours of instruction in seven important reading comprehension skill areas:

* Setting Reading Goals
* Vocabulary Development
* Scanning
* Organizing
* Summarizing
* First Level Inferences
* Answering Important Questions about the Text

Unique Features

Each module of the READY Course uses four paragraphs of text on a topic of interest to adults. Topics range from health related issues such as Saving Money with Generic Drugs to general interest topics like Buying a Used Car. The four paragraphs introduced in each module create the context for all the exercises in that module. The exercises address each

of the reading comprehension skill areas listed above. The content remains constant so the student can concentrate on practicing the process skills without being presented with new content as well.

The exercises within the READY Course use the mouse almost exclusively as the input device. The first exercise of the module introduces new students to the mouse and ways to use it. The mouse allows the students to manipulate the text on the screen in a variety of ways. The exercises are designed to give the student opportunities to choose answers to a series of complex questions without typing words, letters, or numbers into the computer. The mouse also allows the student to quickly access the definition and pronunciation of difficult vocabulary words from each of the paragraphs. Because of the mouse, the READY Course is extremely interactive. The student controls the pace of the instruction as well as the amount of help he or she requires to understand the text.

One of the most important features of the READY Course is the use of digitized audio. Digitized audio produces extremely high quality sound. A human voice is recorded and becomes part of the computer program through the process of converting an audio tape recording to digital files that can be stored in the hard drive of the computer. Students hear the audio through headphones that are attached to a digital audio board in the computer. Currently, the audio is available when the four paragraphs of text are first introduced and again during the vocabulary development exercises. Within the context of the paragraphs, vocabulary words are highlighted in yellow. The student can choose to click on any of these words to see a phonetic spelling and definition of the word appear in a window on the screen. Then the student can choose to have the word and its definition pronounced. The pronunciation and definition can be repeated as often as the student wishes by simply clicking the mouse button.

Future of the READY Course

CPCC has received a one year grant from the North Carolina Department of Community Colleges to expand development of the READY Course and begin to update the computer systems for delivery of both the Learning Style Survey and the READY Course on six campuses. A total of ten READY Course modules will be completed early in 1989. The audio capabilities will be greatly expanded to give students the opportunity to hear the paragraphs read to them as well as the directions for each exercise. Also, design work has begun on a new course for students who are functioning at a 0-2 grade reading level. This course will rely heavily on digitized audio. Plans are underway to convert both of these courses to CD-ROM format. CD-ROM allows a massive storage capability which is necessary to use the level of digitized audio planned for these courses.

In addition to development already completed for IBM and compatible computers, CPCC is beginning to investigate the possibility of converting the READY Course as well as future course development to the Apple Computer environment. Apple has loaned the college computer equipment to help begin this process.

Evaluation of the READY Course including investigation into the most appropriate reading level for students using this course is currently underway at community college based literacy centers in Kansas City, Dallas, Eugene, Charlotte, and Phoenix. Results of this study will be available during the first quarter of 1989. Replication of this research and new areas of study will begin at six community colleges in North Carolina early next year.

Initial evaluation of the READY Course from both instructors and students has been extremely positive. It's clear that the addition of audio to computer based courses holds much promise for the future of literacy instruction.

The READY Course
A Description of the Objectives and Activities for each Lesson

Lesson 1 -- Ready, Set, Go

Objective

This is an introductory lesson designed to build the student's skill with the mouse before beginning the reading exercises.

Activities

- Moving the mouse through a series of tasks that develop skills necessary in future lessons.

Lesson 2 -- Setting Reading Goals

Objective

The student will be able to identify methods for locating the most important information given a specific passage of text.

Activities

- Setting personal goals for reading
- Classifying a list of reading goals as important or unimportant
- Recognizing important "Who, What, When, Where, Why, and How" questions

Lesson 3 -- Vocabulary

Objectives

- The student will be able to read a passage and pronounce selected words
- The student will be able to recognize correct usage of selected vocabulary words

Activities

- At least twenty vocabulary words can be chosen from the paragraphs. When the student selects each word, the phonetic spelling and definition is displayed and the student can chose to hear the word and its definition pronounced via digitized audio.
- The student can chose to complete extensive vocabulary exercises on any or all of the vocabulary words
- There is a final usage test for all the vocabulary words

Lesson 4 -- Quick Scan for Information

Objectives

- The student will be able to locate a given word in a passage of text by quickly scanning the passage.
- The student will be able to identify the key word or words in a sentence.

Activities

- Locate specific words in the text by scanning
- Identify the key words in a question
- Locate the answer from the text to a literal question

Lesson 5 -- More Quick Scan (First Level Inference)

Objective

The student will demonstrate comprehension of a passage by answering questions using synonyms for key words in the passage.

Activities

- Identify key words in a sentence
- Identify synonyms for key words
- Use synonyms and key words to scan for answers

Lesson 6 -- Organization

Objective

The student will be able to identify the topic in a passage of text and match ideas to the topic to form an overall organization of the passage.

Activities

- Identify the topic of a paragraph
- List topics in order to form an overall organization

Lesson 7 -- Summarizing

Objective

The student will be able to identify a sentence that summarizes the main idea of a passage.

Activity

- Choose a sentence that best summarizes the topic of a passage

Lesson 8 -- Answering the Important Questions

Objective

The student will be able to demonstrate comprehension of a passage by answering the goal setting questions from Lesson 2.

Activity

- Choose the answers to six questions about the paragraphs

Lesson 9 -- Hard Word Review

Objective

This lesson gives the student an opportunity to review the vocabulary words introduced in Lesson 3.

Activity

- The student can chose to complete extensive vocabulary exercises on any or all of the vocabulary words

Appendix F

The READY Course Instructor's Comment Report

The READY Course

Instructor's Comment Report

March 1, 1989

This report is a compilation of responses from twenty-one North Carolina Adult Basic Education instructors and administrators who are currently using the READY Course with their students. The results of this survey will be used to improve the READY Course before it is finalized.

Tim Songer
Project READY Director
Central Piedmont Community College
Charlotte, North Carolina

The READY Course - Instructor's Comment Report

The following directions appeared on the Instructor's Comment Form. After each question in the survey, I have listed the percentage of instructors who chose the numbered response at the top of each column. The last column on the right indicates the mean (X) choice for each question. Below each of the six categories of question is listed the highest possible score, the mean score for that category, and additional comments from the instructors.

After reviewing the READY Course and/or observing students using this software, please respond to the following items by circling the response you feel is most accurate. Please write in any additional comments in the space provided. Your feedback is very important during this formative evaluation stage of the READY Course development. Thank you for your time.

I. Learner/Computer Interaction

	Strongly agree					Strongly disagree	
	6	5	4	3	2	1	$\overline{X}$
1.Exercises are appropriate	38%	33%	29%	0	0	0	5.09
2. Exercise frequency is adequate	43%	43%	14%	0	0	0	5.29
3. Directions and instructions are clear	29%	38%	24%	5%	5%	0	4.81
4. Type and place of requested response is clear	43%	38%	19%	0	0	0	5.24
5. Feedback after response is helpful	52%	43%	5%	0	0	0	5.48
6. Final evaluation of learner's performance is provided	28%	43%	14%	10%	0	5%	4.76
7. Software is easy to operate	24%	57%	14%	5%	0	0	5.00
	Possible score = 42				$\overline{X}$ = 35.71		

Additional comments:

- Students have to develop ability to use the mouse.
- Mouse is good because basic level students have trouble using the keyboard.
- Instructions can be complicated for students, which requires further explanation from the instructor.
- It seems to take students awhile to get familiar with the program format. This may be because none of them have experience using the mouse.

II. Learner Control

	Strongly agree					Strongly disagree	
	6	5	4	3	2	1	$\overline{X}$
1. Option, menus, and choices are available	57%	33%	5%	0	0	0	5.38
2. Display time is under learner's control	43%	43%	14%	0	0	0	5.19
3. Mouse exercise directions are adequate	48%	33%	14%	5%	0	0	5.24
4. Movement within software is easy	24%	38%	28%	5%	5%	0	4.48
5. Graceful exits are available at all times	33%	43%	14%	5%	0	5%	4.90
	Possible score = 30					$\overline{X}$ = 25.52	

Additional comments:

- Movement within the software is easy once I got the hang of it.
- Students don't always feel they can control movement in the program.
- May need to give students the ability to go back.

III. Sequencing of Instructional Events

	Strongly agree					Strongly disagree	
	6	5	4	3	2	1	$\overline{X}$
1. Goals and objectives were specified explicitly	47%	43%	5%	5%	0	0	5.33
2. Instruction is organized from general to specific	52%	33%	10%	0	5%	0	5.29
3. Adequate exercises and examples are provided to explain concepts	43%	28%	19%	5%	0	5%	4.95
4. Major concepts are easily identified through visual cues	33%	47%	14%	0	5%	0	5.05
5. Different opportunities are provided for different ability levels	19%	10%	28%	28%	0	14%	3.76
	Possible score = 30					$\overline{X}$ = 24.38	

Additional comments:

- Explanations to the students are very clear.
- Different materials may need to be defined more specifically for different grade level students.
- The course progresses logically and reviews and previews well.

IV. Screen Design

	Strongly agree					Strongly disagree	
	6	5	4	3	2	1	$\overline{X}$
1. Screen layout is pleasing	43%	47%	0	5%	0	5%	5.14
2. Instructions are provided in areas separate from text	52%	33%	15%	0	0	0	5.38
3. Color is used effectively	62%	38%	0	0	0	0	5.62
4. Exercises with the mouse require dexterity appropriate to students' ability	19%	38%	43%	5%	0	0	4.67

Possible score = 24 $\overline{X}$ = 20.86

Additional comments:

- Directions on the Ready, Set, Go lesson could be simplified and still be clear.
- The course is easy on the students' eyes.
- Color contrast enables the user to focus on the appropriate item.
- Some students experience frustration during timed exercises because of problems using the mouse.

V. Readability

	Strongly agree					Strongly disagree	
	6	5	4	3	2	1	$\overline{X}$
1. Screens contain an amount of text appropriate to students' reading ability	19%	29%	29%	9%	5%	9%	4.19
2. Content is relevant to adults	48%	38%	9%	5%	0	0	5.29
3. Reading level is appropriate for adults functioning between 4th and 8th grade level	14%	19%	33%	24%	5%	5%	4.00
4. Software teaches important reading comprehension skills	52%	43%	0	0	5%	0	5.38

Possible score = 24 $\overline{X}$ = 18.86

Additional comments:

- I have trouble agreeing with some of the key words that have been chosen.
- Readability is appropriate according to samples using Fog readability index.
- Program is a little difficult for those functioning on the 4th grade level. Audio will be very helpful for this group.
- Instructions for the exercises are good but could be simplified.

VI. Administration

	Strongly agree					Strongly disagree	
	6	5	4	3	2	1	$\overline{X}$
1. Accessing the course on the computer is easy	24%	43%	28%	5%	0	0	4.90
2. Procedures for enrolling new students is clear	24%	38%	33%	0	5%	0	4.76
3. Student progress is easily tracked	24%	33%	33%	5%	5%	0	4.67
	Possible score = 18				$\overline{X}$ = 14.28		

Additional comments:

- It would be helpful to be able to check the progress of the student in terms of percentage correct at any point. This would facilitate greater student independence while still allowing the instructor to determine the progress being made.
- Directions for enrolling students didn't always match what happened on the screen.
- Enrolling new students was somewhat confusing at first.
- Without scores for each lesson there is no way to tell if the student is trying, learning, or just clicking the mouse.

VII. Future Versions

1. Please write any suggestions you have for improving the READY Course.

- In the vocabulary section, many students could figure out the words only because they see them in context first. These students did not call up explanations and definitions for the words. I tend to think that if the students were first presented with the entire list of words they would use the definition capability more.
- It might help to increase the size of the print or the amount of space between the lines.
- We need more equipment to deliver this course. We are looking into projecting some lessons for use with an entire class.
- Audio capability will greatly add to the course.
- Be more certain of the choices for "key words". When you are locating a where question, I feel that the five Ws are important key words.

2. What additional content areas do you feel would be appropriate for this format?

- entertainers, sports
- mystifying facts
- general first aid and more health information
- citizenship and branches of U.S. government related to this
- job interview skills
- child care
- self motivation
- employment trends
- more timely areas like the greenhouse effect, abortion rights, drug abuse, space travel

Appendix G

The READY Course Evaluation: Preliminary Results

The READY Course Evaluation: Preliminary Results

March 10, 1989

Tim Songer
Project READY Director
Central Piedmont Community College
Charlotte, North Carolina

The READY Course Evaluation: Preliminary Results

Background

The READY Course is a series of modules designed to use microcomputers to teach reading comprehension skills to adults functioning between the fourth and eighth grade reading level. In 1988, four modules using the READY Course format were developed. Each module represented an average of five hours of reading instruction, so the four modules totaled twenty hours of instruction. The modules are titled:

Health Issues: Heart Attacks
Health Issues: Tetanus
Consumer Issues: Saving Money with Generic Drugs
What you should do if you are in a Car Accident

A study was organized at Central Piedmont Community College (CPCC), Charlotte, North Carolina to test the usefulness of these modules for improving the reading skills of low-litertate adults. The initial design used community college students (from CPCC and Lane Community College, Eugene, Oregon) who were enrolled in some form of adult basic education classes as participants. The participants were divided into two groups. The Experimental Group (E Group) used only the four modules of the READY Course described above over the period of twenty hours of instruction. The Control Group (C Group) used traditional classroom reading instruction over the same period of time. Both groups were given a standardized reading test as a pre-test before instruction began and a post-test after the instruction period was completed. The standardized test used was the ABLE Screening Battery.

Two null hypotheses were formulated prior to the beginning of the study:

H_0 = The E Group and the C Group have the same distribution.
H_1 = The E Group gain scores are stochastically (randomly) larger than the C Group gain scores.

Results

Table 1 describes the ABLE raw score pretest, posttest, and gain/loss data for both E and C Groups. Though the number of participants is small for this preliminary study (E Group, $N_1 = 5$; C Group, $N_2 = 6$), the amount of raw score gains for the E Group as compared to the C Group is very encouraging. The E group reported a mean gain of 4.4 over twenty hours of instruction while the C Group reported a much lower mean gain of 1.17.

Table 2 addresses the null hypotheses. Both H_0 and H_1 are shown to be false. The distribution of scores shown in Table 2 has the probability of occuring under H_0 of $p = .015$. The larger gain scores reported by the E Group as compared to the C Group has the probability of occurring under H_1 of $p = .030$. Both of these findings are significant at the .05 level using the Mann-Whitney U Test.

Discussion

The results described here point to the usefulness of the READY Course as an instructional tool for teaching reading comprehension skills to adults. Participants in both the E Group and the C Group were given instruction designed to improve their reading comprehension skills. The data collected indicate that the READY Course is more effective given the limited number of instructional hours used in this treatment (20 hours). Further research should be conducted to expand both the number of participants and the amount of instruction delivered between pretest and posttest.

Table 1
The READY Course Evaluation
Comparison of the E & C Groups Pre, Post, and Gain/Loss Data

E Group, $N_1 = 5$

ABLE Raw Score

Subject	Pre	Post	Gain/Loss
1.	46	46	0
2.	43	44	+1
3.	41	46	+5
4.	43	45	+2
5.	27	41	+14
	$\Sigma = 200$	$\Sigma = 222$	$\Sigma = 22$
	$X = 40$	$X = 44.4$	$X = 4.4$

C Group, $N_1 = 6$

ABLE Raw Score

Subject	Pre	Post	Gain/Loss
1.	39	42	+3
2.	38	37	-1
3.	41	42	+1
4.	36	30	-6
5.	45	43	-2
6.	42	40	-2
	$\Sigma = 241$	$\Sigma = 234$	$\Sigma = -7$
	$X = 40.17$	$X = 39.0$	$X = 1.17$

Table 2
The READY Course Evaluation
Data Analysis of the E & C Groups' Gain/Loss Scores

Mann-Whitney U Test

E Scores	0	+1	+2	+5	+14	
C Scores	-6	-2	-2	-1	+1	+3

Score	-6	-2	-2	-1	0	+1	+1	+2	+3	+5	+14
Group	C	C	C	C	E	C	E	E	C	E	E

$U = 0 + 0 + 0 + 0 + 1 + 2 = 3$
$U \leq 3, N_1 = 5$ Experimental Group, $N_2 = 6$ Control Group

H_0 = The E Group and the C Group have the same distribution.
H_1 = The E Group gain scores are stochastically (randomly) larger than the C Group gain scores.

$U \leq 3$ has the probability of occurence under H_0 of $p = .015$
$U \leq 3$ has the probability of occurence under H_1 of $p = .030$

The findings are significant at the .05 level

Mann-Whitney U Test Reference:
Siegel, Sidney. 1956 *Nonparametric Statistics for the Behavioral Sciences.* New York: McGraw-Hill Book Company, 116-127.

Appendix H

The Learning Style Survey Users List
3/15/89

The Learning Style Survey Users List as of 3-15-89

Richard Jones
University of Arkansas

Dr. Terilyn Turner — 2 copies
Technology for Learning Center
St. Paul, Minnesota

Dr. Ken Gordon — 2 copies
Jackson State University
Jackson, Mississippi

Kevin O'Brien — 2 copies
The Learning Center
Ottawa, Ontario

Kamala Anandam
Office of the IBM/ACIS Consulting Scholar
Miami-Dade Community College

Pat Kercher
Project Access
Great Falls, Montana

James Williams
IBM
Marietta, Georgia

Pam Theisen
EDSI
Dearborn, Michigan

Susan Anderson
Eastern Michigan University
Ypsilanti, Michigan

Dale M. Herder
Lansing Community College
Lansing, Michigan

Steve Floyd — 4 copies
Floyd Consulting and Design
Atlanta, Georgia

Linda Olsen
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Appendix I

CPCC/SETS Press Release

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CHARLOTTE, NORTH CAROLINA 28235
TELEPHONE: 704/342-6633

cpcc

CENTRAL PIEDMONT
COMMUNITY COLLEGE

PRESS RELEASE **JANUARY 16, 1989**

SETS PUBLISHES LEARNING STYLE SURVEY DISC FROM CENTRAL PIEDMONT COMMUNITY COLLEGE

Synergistic Educational Technology Systems, Inc., the educational technology company based in Orlando, Florida, widely known as SETS, and Central Piedmont Community College, located in Charlotte, North Carolina today formally announced the publication of the Learning Style Survey videodisc based assessment system (LSS).

The LSS is an assessment tool that was developed to provide instructors and counselors at Central Piedmont Community College (CPCC) with a report on the preferred learning style of students in their Adult Basic Literacy Education, "ABLE" program. As students go through the 25 minute assessment, two things are accomplished. One, students learn more about their own generic learning skills and how to strengthen them, and two, the system stores their responses and generates a report for the professionals at the institution to guide them in providing individual assistance to each learner.

The program is based on the Cognitive Styles Interest Inventory. Development versions were validated at 8 colleges and 1 university involving over 1000 student tests during the two year development.

SETS will provide editorial, programming, manufacturing, packaging, marketing, and sales functions for the videodisc based learning system developed around CPCC's disc. A complete system including a fully operational XT compatible computer with video and graphics capabilities, interface, laser videodisc player, color monitor and LSS courseware will sell for less than $4,900. The courseware alone is available for InfoWindow, View, and VAL Microkey systems at $950.

Tim Songer, Project READY Director at CPCC, said "We find student enthusiasm for learning has increased as they better understand learning style differences, recognize their own learning preferences, and improve their skills. Longitudinal studies are incomplete at this time, but indications from instructors whose students have been exposed to this program are that students have improved their learning attainment."

Wade E. Dunn, President of SETS, said "The Learning Style Survey disc is the type of outstanding work we seek to publish. Our philosophy is to work with only those programs that meet our high standards for educational excellence, including affordability. The cost of the program is well within the needs of our cost conscious educational customers. Amortized over three years, the cost per student served for a complete system is under $1.00. The LSS is an enlightened product that meets important needs of our customers at an affordable cost."

Dr. Tom Griffin, Dean for Basic Studies at CPCC, commented "In the information age, our knowledge base is doubling every five years. If we are to meet our challenges of improving and increasing the quantity and quality of education we deliver, we must empower our professional instructors and support personnel with appropriate technological tools. The LSS system is a tool that can make it possible to assess affordably an important attribute for virtually every student who comes to our college. Neither we, nor most others, could do this important work without such a system. We hope the SETS LSS system will be a significant contribution to our colleagues providing education and training in colleges, corporations, and job training programs everywhere."

Equal Opportunity/Affirmative Action Employer

Appendix J

The READY Course Users List
3/15/89

The READY Course Users List as of 3-15-89

Central Piedmont Community College - Charlotte, N.C.
Durham Technical Community College - Durham, N.C.
Surry Community College - Dobson, N.C.
Coastal Carolina Community College - Jacksonville, N.C.
Caldwell Community College - Lenoir, N.C.
Wayne Community College - Goldsboro, N.C.
Rowan-Cabarrus Community College - Kannapolis, N.C.
Forsyth Technical Community College - Winston-Salem, N.C.
Carteret Community College - Morehead City, N.C.
Guilford Technical Community College - Greensboro, N.C.
Piedmont Technical Community College - Yanceyville, N.C.
Miami-Dade Community College - Miami, Florida
Maricopa Community College District - Phoenix, Arizona
Los Angeles Department of Correctional Education
Cuyahoga Community College - Cleveland, Ohio
Lane Community College - Eugene, Oregon
Dallas Community College District - Dallas, Texas
University of Pittsburgh
Johnson County Community College - Overland Park, Kansas
The Learning Center - Ottowa, Ontario